

SYNOPTIC FLORA OF THE KOTA DIVISION (S. E. RAJASTHAN), PART II*

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Botanical Survey of India, Shillong

GENTIANACEAE

1. Ovary 2-loculed; style filiform; corolla rotate, blue-purple or white; flowers in dichotomous cymes ...
Ovary 1-loculed; style linear; corolla tubular below; flowers in axillary clusters or cymes ...
2. Corolla regular ...
Corolla irregular ...
3. Flowers white in axillary sessile clusters ...
Flowers pink or white in terminal dichotomous cymes ...
4. Flowers yellow; stigma subentire; calyx 2mm long ...
Flowers pink or white; stigma deeply 2-lobed; calyx 5 mm long ...

1. *Exacum*

HOPPEA Willd.

2

H. dichotoma Willd.; FBI 4: 100; FUGP 2: 76.

3

Widespread in Rajasthan. Fls. & frts.

4

Sept.-Oct. Dani talai Verma 1784; Jhalawar Verma 3324; Kyasra. Verma 1807.

2. *Enicostemma*3. *Centaurium*4. *Hoppea*5. *Canscora*

CANS CORA Lamk.

C. diffusa (Vahl) R. Br. ex R. & S.: FBI 4: 103; FUGP 2: 76.

Widespread in Rajasthan. Fls. & frts. Aug.-Jan. Kota Wadhwa 9331; 9244; Mangli river bank Verma 1859; Khanpura Verma 6427; Pirawa-Kharagpura Verma 6821; Jhalawar Majumder 10087; Kota Naka Verma 483.

EXACUM L.

E. pedunculatum L.; FBI 4: 97; FUGP 2: 72.

In south-east Rajasthan. Fls. & frts. Nov.-Jan. Jhalawar Majumder 10086.

ENICOSTEMMA Bl. nom. conserv.

E. hyssopifolium (Willd.) Verdcourt *E. littorale* Bl.; FBI 4: 101; FUGP 2: 73.

Widespread in Rajasthan. Fls. & frts. Sept.-April. Kota; Shahabad Verma 642; Mangli river bank Verma 1868; Kota Wadhwa 9450; Bijliya BhadaK Wadhwa 7402; Raipur-Belghar. Wadhwa 5480.

Local name: Chota chireta.

CENTAURIUM Hill.

C. centaureoides Rao et Hemadri *Erythria roxburghii* G. Don; FBI 4: 102; FUGP 2: 74.

In the region east of the Aravalli (Pratap-

MENYANTHACEAE

NYMPHOIDES Hill.

Seeds with spiny tubercles; corolla-lobes entire but with a longitudinal fold down the middle ...

1. *N. cristatum*

Seeds smooth or minutely tuberculate; corolla without longitudinal fold down the middle of each lobe, lobes fimbriate, densely papillose ...

2. *N. indicum***N. cristatum** (Roxb.) O. Ktze. *Limnanthemum cristatum* Griseb; FBI 4: 131; FUGP 2: 79.

Widespread in Rajasthan; common in jheels or ponds. Fls. & frts. throughout the summer and also during colder months. Jhalawar Verma 3335; Shahabad-Baran Rd.

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Majumder 10436; Asnawar-Eklera Rd.
Wadhwa 7534; Kota Wadhwa 9483.

Local name: Chuli.

N. indicum (L.) Ktze. *Limnanthemum indicum* (L.) Griseb.; FBI 4: 131; FUGP 2: 79.

In the regions east of the Aravallis (Banswara *Verma* 218; Bansi *Verma* 1714). Fls. & frts. April-Dec. Shahabad *Majumder* 10436.

Local name: Bara chuti.

EHRETIACEAE

Styles twice-forked trees ... 1. *Cordia*
Style solitary; small shrubby plants ... 2. *Rotula*

CORDIA L.

Leaves opposite not tomentose beneath; filaments hairy at the base ... 1. *C. dichotoma*
Leaves sub-opposite; lower surface tomentose; filaments glabrous ... 2. *C. gharaf*

C. dichotoma Forst. f.; *C. myxa* of FBI 4: 137; FUGP 2: 82.

Widespread in Rajasthan. Fls. & frts. Jan.-May. Kota Wadhwa & Prosad 9252. Daosa, Mahewa Wadhwa & Srivastava 8144.

C. gharaf (Forsk.) Ehrenb. et Aschers *C. rothii* R. & S.; FBI 4: 138; FUGP 2: 85.

Widespread in Rajasthan. Fls. & frts. April-June. Manoharthana *Verma* 3456. *C. macleodii* Hook. f. et. Thom. has also been collected from the adjoining area (Rampur, Pratapgarh *Verma* 2701) that can be identified by the ribbed calyx and ovate-cordate, densely tomentose leaves reaching 15 cm across. Leaves 3-5-nerved at the base, hairs on the undersurface woolly, branched and flowers polygamous. The plant appears to be rather scarce in the area.

ROTULA Lour.

R. aquatica Lour. *Rhabdia lycioides* Mart.; FBI 4: 145; FUGP 2: 88.

In the south-east Rajasthan usually on the rocky riverbed forming small bushes. Fls. & frts. Oct.-Nov. Bansi, Kalisind river *Verma* 6997; Parbati river *Majumder* 13263.

BORAGINACEAE

1. Calyx large, deeply 5-lobed, enlarged in fruit, winged, cordate or auricled at the base; anthers conniving, connectives much produced and twisted at the tip of the anthers; style subterminal ... 1. *Trichodesma*
- Calyx not auricled nor connectives twisted; style terminal or gynobasic; anthers not conniving nor connectives as above ... 2
2. Styles 2, terminal; flowers solitary, axillary; prostrate herbs; leaves depressed on veins, raised in between and silky hairy ... 2. *Coldenia*
- Style usually one; flowers on long spikes or racemes; leaves not as above ... 3
3. Nutlets often with hooked hairs; style gynobasic; erect herbs ... 3. *Cynoglossum*
- Nutlets shallowly lobed or not, without hooked hairs; style terminal; erect or prostrate herbs ... 4. *Heliotropium*

TRICHODESMA R. Br.

1. Anthers included, connivent but free, back of connectives with straight erect hairs; tips pointed but not twisted; leaves densely covered by tubercled-based hairs ... 1. *T. sedgwickianum*
- Anthers exerted, combined into a cone; back of connectives densely tomentose, tips twisted; leaves with or without tubercled-based hairs. ... 2
2. Leaves with few or no tubercled based hairs ... 2. *T. indicum* var. *indicum*
- Leaves densely covered with tubercled based hairs ... 3. *T. indicum* var. *amplexicaul*

T. indicum (L.) R. Br.; FBI 4: 153; FUGP 2: 94.

Widespread in Rajasthan. Fls. & frts. Aug.-Oct. Kota: Shahabad *Majumder* 10488.

T. indicum var. *amplexicaul* Cook

Widespread in Rajasthan; Naka-kota *Verma* 458; Manoharthana *Verma* 3474.

T. sedgwickianum Banerjee

Widespread in Rajasthan. Fls. & frts. Aug.-Oct. Shahabad *Majumder* 10809.

COLDENIA L.

C. procumbens L.; FBI 4: 144; FUGP 2: 88.

Widespread in Rajasthan; usually in the moist places. Fls. & frts. Sept.-Oct. Jhalapatan Wadhwa 9484.

CYNOGLOSSUM L.

C. glochidiatum Wall. ex Benth. *C. meeboldii* Brand; *C. denticulatum* A. DC. var. *zeylanicum* C. B. Clarke in FBI 4: 157; FUGP 2: 96.

In south Rajasthan including Mt. Abu, may be found in the south-east part also.

HELIOTROPIUM L.

- | | | |
|---|---|--------------------------|
| 1. Leaves elliptic or obovate ... | 2 | |
| Leaves linear or linear-lanceolate ... | 3 | |
| 2. Calyx-lobes short, not one-third the length of the tube, but completely enveloping the fruit; spikes short woolly; a prostrate villous herb ... | | 1. <i>H. supinum</i> |
| Calyx deeply lobed, but not completely enveloping the fruit; spikes 5-14 cm long; calyx-segments very unequal; procumbent or even prostrate herbs ... | | 2. <i>H. ovalifolium</i> |
| 3. Fruits distinctly 4-lobed; an erect herb with stiff ascending branches ... | | 3. <i>H. zeylanicum</i> |
| Fruit not or obscurely 4-lobed; a much-branched small procumbent herb ... | | 4. <i>H. strigosum</i> |

H. supinum L.; FBI 4: 149; FUGP 2: 91.

Unlike in other species of the genus the calyx completely covers the fruit except the persistent style. Widespread in Rajasthan. Fls. & frts. Sept.-Oct. Kota; Shahabad Wadhwa 9247; Kalisind river bank Verma 3401; 3389.

H. ovalifolium Forssk.; FBI 4: 150; FUGP 2: 92.

Widespread in Rajasthan; usually in dried up ponds, ditches or in shallow depressions by the road-sides; Fls. & frts. Aug.-Feb. Kota; Shahabad Verma 665; Jhalawar Wadhwa & Verma 7671; Verma 3364; 7438; Jhalawar Wadhwa & Prosad 9490.

H. zeylanicum Lamk.; FUGP 2: 93; *H. paniculatum* R. Br.; FBI 4: 151.

Throughout Rajasthan. Fls. & frts. Aug.-Oct. Kota; Shahabad Verma 810; Kishanganj Verma 723.

H. strigosum Willd.; FBI 4: 151; FUGP 2: 93.

Widespread in Rajasthan. Fls. & frts. Aug.-Oct. Kota; Shahabad Verma 410.

CUSCUTACEAE

CUSCUTA L.

C. reflexa Roxb.; FBI 4: 225; FUGP 2: 100. Widespread in Rajasthan; Fls. & frts. Sept.-Feb. Jhalawar; Eklera Majumder 10032; Bakani Modiya khal Verma 7041; Dug Verma 6703.

CONVOLVULACEAE

- | | | |
|--|---|-----------------------|
| 1. Pollen-grains spinulose ... | 2 | |
| Pollen-grains not spinulose ... | 4 | |
| 2. Fruit a thin walled capsule, opening by valves or irregularly dehiscent; herbaceous climbers or creepers, rarely sub-erect, than with latex ... | | 1. <i>Ipomoea</i> |
| Fruit indehiscent, coriaceous or fleshy; woody twinnings ... | | 3 |
| 3. Fruit mealy or fleshy; corolla funnel-shaped, stigmas globose ... | | 2. <i>Argyrea</i> |
| Fruit woody; corolla salver-shaped; stigmas linear-oblong ... | | 3. <i>Rivea</i> |
| 4. Styles 2, each forked; stigmas linear or slightly clavate; flowers small, in few-flowered cymes or axillary, solitary ... | | 4. <i>Evolvulus</i> |
| Style one, entire or with two minute branches concealed by the stigmas ... | 5 | |
| 5. Stigmas filiform; leaf-base hastate or sagittate; capsule 4-valved or indehiscent ... | | 5. <i>Convolvulus</i> |
| Stigmas globose; capsules opening by 4-valves or irregularly dehiscent; leaf-base not as above ... | | 6. <i>Merremia</i> |

IPOMOEA L.

- | | | |
|--|---|-----------------------|
| 1. Sepals keeled and produced into an awn; stem with spiny outgrowths; stamens and styles exerted ... | | 1. <i>I. muricata</i> |
| Sepals not as above, more or less flat; stem not spiny; stamens not exerted ... | 2 | |
| 2. Sepals cordate at base, gradually tapering to an acuminate apex ... | | 2. <i>I. sinensis</i> |
| Sepals not cordate at the base; apex tapering or not ... | 3 | |
| 3. Sepals more or less glabrous ... | 4 | |
| Sepals densely hairy ... | 8 | |
| 4. Leaf-segments coarsely dentate to deeply and irregularly pinnatifid ... | | 3. <i>I. coptica</i> |
| Leaves more or less undivided, never palmi-lobed ... | 5 | |
| 5. Corolla under 2.5 cm long, yellow or white with purple eye; sepals acute; a slender twinner ... | | 4. <i>I. obscura</i> |
| Corolla 5 cm long or longer with or without purple eye ... | 6 | |
| 6. Corolla funnel-shaped with purple eyes; peduncles long, not thickened below the flowers; an aquatic or semi-aquatic herb with spongy stem and nodal roots ... | | 5. <i>I. aquatica</i> |
| Terrestrial climbers without nodal roots ... | 7 | |

7. Sepals eglandular; flowers under 6 cm long; corolla salver shaped; peduncles often thickened below the flowers; a climber in the hedges without latex ...
 Sepals glandular; flowers over 7 cm long; corolla funnel-shaped; a sub-erect shrubby plant with large leaves and latex ...
8. Flowers in axillary clusters, small; ovary and capsules hairy; a prostrate or twinning herb ...
 Flowers in involucre heads, if not large, scarlet ...
9. Flowers in involucre heads, bracts leafy, outer ovate or elliptic-oblong; leaves palmately shallowly or deeply lobed, densely stiff hairy ...
 Flowers few together, not in heads, scarlet; outer sepals with long drawn out tips ...
10. Leaves green on both the surfaces ...
 Lower surface white with adpressed hairs ...
6. *I. sepiaria*
 7. *I. fistulosa*
 8. *I. eriocarpa*
 9
 9. *I. pestigridis*
 10
 10. *I. nil*
 11. *I. dichroa*

I. muricata (L.) Jacq.; FBI 4: 197. *Calonyction muricatum* G. Don; FUGP 2: 118.

Widespread in Rajasthan, particularly in the region east of the Aravallis (Chittor Majumder 12459). Fls. & frts. Sept.-Nov. Jhalawar-Eklara Road Verma 7520.

I. sinensis (Desv.) Chois.; Verdcourt in Kew Bull. 204, 1958. *I. calycina* C. B. Clarke in FBI 4: 201; FUGP 2: 112.

In the region east of the Aravallis (Banswara Kanodia 75280 at W. C.). Fls. & frts. Oct.-Dec. Kota Majumder 10120.

I. coptica (L.) Roth ex R. et S. *I. dissecta* Willd.; FBI 4: 200; FUGP 2: 115.

Widespread in Rajasthan. Fls. Feb.-March. Jhalawar Wadhwa 8353.

I. obscura (L.) Ker.-Gawl.; FBI 4: 207; FUGP 2: 115.

Throughout Rajasthan; in the hedges and shrubberies as twinners. Fls. & frts. July-April. Jhalawar: Pirawa Verma 6829; Bakani-Kalisind Verma 7004; Kyasra Verma 6808; Rampura Verma 1797.

I. aquatica Forssk. FBI 4: 210; FUGP 2: 114.

Widespread in Rajasthan; an aquatic plant of medicinal value. Fls. & frts. Sept.-May. Bundi: Hindoli Verma 1900; Jhalawar: Ek-

lera Wadhwa 7502; Kota: Sitabari Wadhwa et Prosad 9305.

I. sepiaria Roxb.; FBI 4: 209; FUGP 2: 115.

In the region east of the Aravalli; a perennial twinning herb. Fls. & frts. Aug.-Dec. Jhalawar: Sarhod Wadhwa 3566; Kota: Baran-Shahabad Road Majumder 10814.

I. fistulosa Mart. ex Chois.

Native of America. Planted or naturalized in the region east of the Aravallis (Dungerpur Verma 182; Jaipur Wadhwa 8272). Fls. & frts. April-July. Kota: Nahargarh Wadhwa 9398; Baran Majumder 10870.

I. eriocarpa R. Br.; FBI 4: 204. *I. hispida* R. & S. (non Zucc.); FUGP 2: 113.

Widespread in Rajasthan. Fls. & frts. Sept.-May. Jhalawar: Bijliya Bhadak Verma 7442; Kota: Sitabari Wadhwa 9296; Chandrapura Verma 1807; Shahabad Majumder 10486.

I. pestigridis L.; FBI 4: 204; FUGP 2: 116.

Widespread in Rajasthan. Fls. & frts. Aug.-Nov. Kota: Shahabad Verma 494; Majumder 13102.

I. nil (L.) Roth *I. hederacea* C. B. Clarke in FBI 4: 199; FUGP 2: 116.

Widespread in Rajasthan. Fls. & frts. Sept.-May. Kota Wadhwa 1983; Chandrapura Verma 1803; 1827; Jhalawar: Khanpura Wadhwa 9585; Kokanda Denwas Wadhwa 9543; Kota: Baran Majumder 10819; Kota Majumder 13236.

I. dichroa (R. & S.) Chois. *I. pilosa* (Roxb.) Sweet (non Hott.); FBI 4: 213; FUGP 2: 114.

Widespread in Rajasthan. Fls. & frts. Sept.-Nov. Jhalawar: Sarhod Wadhwa 3573.

ARGYREIA Lour.

1. Leaves ovate, sparingly hairy at both the surfaces; base cordate; bracts ovate, obtuse; sepals orbicular, two inner with membranous margins; corolla 3.8-5 cm long ...
 Leaves silky white beneath, ovate-cordate; bracts persistent with parallel nerves, oblong-elliptic; sepals elliptic-lanceolate; corolla more than 5 cm long; upper surface of the leaf-blade hirsute or strigose ...

1. *A. strigosa*

2. *A. sericea*

A. strigosa (Roth) Sant. et Patel *Lettsomia setosa* Roxb.; FBI 4: 194; FUGP 2: 122.

In the region east of the Aravallis; Fls. & frts. Sept.-Dec. Jhalawar: Sarhod Wadhwa 7694; Dug Kyasra Wadhwa 6771.

A. sericea Dalz. et Gibbs; FBI 5: 188.

In south-east Rajasthan. Fls. & frts. Sept.-Jan. Kotra-Kajalia Verma 3585.

RIVEA Chois.

R. hypocrateriformis (Lamk.) Chois.; FBI 4: 184; FUGP 2: 119.

Widespread in Rajasthan. Fls. & frts. July-Feb. Kota Verma 426; Jhalawar. Wadhwa 7562; Kokanda Denwas Wadhwa 5416.

EVOLVULUS L.

E. alsinoides (L.) L.: FBI 4: 220; FUGP 2: 104.

Widespread in Rajasthan. Fls. & frts. March-July. Kota: Puraniya Verma 752; Shahabad Verma 412; Wadhwa 1960; Jhalawar Wadhwa 3598; Bakani Verma 6994; Chandrapura Verma 1822.

The other species common throughout the Upper Gangetic Plains, namely *E. nummularius* L. has also been collected from Bharatpur by the author.

CONVOLVULUS L.

Twinning plant; peduncles solitary, axillary ...
Suberect or procumbent undershrub; flowers solitary or 2-4 together, sessile or shortly peduncled ...

1. *C. arvensis*

2. *C. microphyllus*

C. arvensis L.; FBI 4: 219; FUGP 2: 106.

Widespread in Rajasthan (Chittor Majumder 10201; Jaipur Wadhwa 8163; Daosa Wadhwa 8163). Fls. & frts. Nov.-Feb. Jhalawar: Pirawa Kharagpura Verma 6830.

C. microphyllus Sieb. ex Spreng; FBI 4: 218; *C. pluricaulis* Chois.; FBI 4: 218; FUGP 2: 105.

Widespread in Rajasthan. Fls. & frts. July-May. Jhalawar: Manoharthana Verma

3473; Bundi Verma 1908; Jhalawar: Bakani-Kalisind river Verma 7023.

MERREMIA Dennst.

- | | |
|--|---------------------------|
| 1. Leaves simple, reniform, cordate at the base, 2.5 cm long or less; a prostrate slender herb ... | 3. <i>M. emarginata</i> |
| Leaves palmi-lobed or digitate; climbers ... | 2 |
| 2. Peduncles glandular in the upper region, often with few long hairs; sepals glabrous, ovate to oblong, obtuse; corolla 2.5 cm long or less, pale yellow or whitish; plants more or less glabrous ... | 1. <i>M. quinquefolia</i> |
| Peduncles and sepals densely patent hairy so also the leaves, stems and flower-buds | 2. <i>M. aegyptia</i> |

M. quinquefolia (L.) Hall. f.

Trop. America; naturalized at some places in the south-east Rajasthan. Fls. & frts. Nov.-May. Parshad Verma 114; Kota Wadhwa 9400; Jhalawar: Khanpura Verma 6915.

M. aegyptia (L.) Urban. *Ipomoea pentaphylla* Jacq; FBI 4: 202. *Merremia pentaphylla* Hall. f.; FUGP 2: 110.

Widespread in Rajasthan; very similar in appearance to *Ipomoea pestigridis* except the capitate flower-heads. Baran-Shahabad Road. Majumder 10820.

M. emarginata (Burm. f.) Hall. f.; FUGP 2: 109. *Ipomoea reniformis* Chois.; FBI 4: 206.

In the region east of the Aravalli (Jaipur Wadhwa 226). Fls. & frts. Oct.-May. Jhalawar: Dug Verma 6757; Pirawa Verma 6829; Sitabari Wadhwa 9282.

SOLANACEAE

- | | |
|---|--------------------|
| 1. Fruit berry, if dry indehiscent; corolla not tubular ... | 2 |
| Fruit capsular; corolla tubular ... | 4 |
| 2. Anthers dehiscing by pores or slit at the apex; plants often stellate-pubescent; prickly or not; corolla rotate ... | 1. <i>Solanum</i> |
| Anthers dehiscing longitudinally; corolla not rotate ... | 3 |
| 3. Corolla urceolate, lurid yellow or greenish; flowers several together; plants woolly tomentose; calyx accrescent ... | 2. <i>Withania</i> |

Corolla campanulate; calyx accrescent and inflated; flowers solitary, yellow; plants with spreading hairs....

4. Calyx herbaceous, nearly enclosing the fruit; flowers rather small, in terminal panicles or racemes; fruits smooth ...
Calyx leathery, reflexed in fruit; fruits prickly or tuberculate; flowers very large ...

SOLANUM L.

1. Plants unarmed, herbaceous; hairs sparse; leaves entire or sinuate-toothed; flowers white; berry 4 mm across, black, red or yellow ...
Plants prickly, flowers usually bluish, rarely white; berry more than 6 mm across ...
2. Branches usually trailing, densely prickly; leaves lobed, lobes with yellow prickles; fruits smooth, under 2 cm across, bluish or whitish with green stripes; flowers hermaphrodite ...
Plants more or less erect; flowers unisexual; male flowers in a raceme; female solitary; berry 1.8-2.5 cm across, yellow ...

S. surattense Burm. f. *S. xanthocarpum* Schrad. et Wendl.; FBI 4: 236; FUGP 2: 125.

Widespread in Rajasthan. Fls. & frts. during greater part of the year. Jhalawar *Wadhwa* 9496; Sitabari *Verma* 10036; Eklera *Majumder* 10035.

S. incanum L.; FUGP 2: 126. *S. coagulens* Forssk.; FBI 4: 236.

Widespread in Rajasthan. Fls. & frts. Jan.-May. Jhalawar: Sarhod *Verma* 7682; Chandrapura *Verma* 1826.

S. nigrum L.; FBI 4: 229; FUGP 2: 124.

Widespread in Rajasthan. Fls. & frts. Jan.-May.

WITHANIA Pauq. nom. conserv.

W. somnifera (L.) Dun; FBI 4: 239; FUGP 2: 128.

Widespread in Rajasthan (Dungerpur *Verma* 179; Udaipur *Verma* 2; *Majumder* 10332), may be found in the south Rajasthan also. Fls. & frts. Jan.-June.

PHYSALIS L.

P. minima L.; FBI 4: 238; FUGP 2: 127.

3. *Physalis*

4. *Nicotiana*

5. *Datura*

3. *S. nigrum*

2

1. *S. surattense*

2. *S. incanum*

Widespread in Rajasthan. Fls. & frts. May-Aug. Kota: Shahabad *Verma* 460; Kota *Wadhwa* 1993.

NICOTIANA L.

N. plumbaginifolia Viv.; FBI 4: 246.

In the region east of the Aravalli including Mt. Abu (Dungerpur *Verma* 204). Fls. & frts. Nov.-June. Jhalawar *Majumder* 10116.

DATURA L.

Corolla 10-toothed; fruits armed with long weak prickles ... 1. *D. innoxia*
Corolla 5-toothed; fruit tuberculate or with short prickles ... 2. *D. metel*

D. innoxia Mill. *D. metel* C. B. Clarke in FBI 4: 243; FUGP 2: 131.

In the region east of the Aravalli (Dungerpur *Verma* 176; Sawai Madhopur *Verma* 1925). Fls. & frts. Nov.-Feb. Kota *Wadhwa* 9469; Eklera, Asnawar *Wadhwa* 7545.

D. metel L. *D. fastuosa* L.; FBI 4: 242; FUGP 2: 132. *D. fastuosa* var. *alba* Clarke in FBI 4: 243. *D. alba* Nees; FUGP 2: 132.

Widespread in Rajasthan. Fls. & frts. Jan.-April. Kota: Shahabad *Verma* 613; Khanpura *Verma* 6967; Jhalawar *Wadhwa* 9580.

SCROPHULARIACEAE

- | | |
|--|------------------------|
| 1. Leaves all alternate; inflorescence racemose; corolla sub-rotate, yellow; stamens 4-5; herbs, usually hairy ... | 1. <i>Verbascum</i> |
| Leaves at least some opposite, if rarely not so, corolla not sub-rotate ... | 2 |
| 2. Corolla spurred, yellow, leaves often hastate; stamens 4; slender herbs ... | 2. <i>Kickxia</i> |
| Corolla not spurred; leaves not hastate; herbs or shrubs ... | 3 |
| 3. Calyx spathaceous; anther with one fertile spurred loculus ... | 13. <i>Centrathera</i> |
| Calyx not spathaceous; anthers 2-1 locular, rarely spurred ... | 4 |
| 4. Only 2 stamens fertile ... | 5 |
| Stamens 4-5 ... | 9 |
| 5. Stamens exserted; corolla 4-lobed almost rotate ... | 9. <i>Veronica</i> |
| Stamens included; corolla 5-lobed ... | 6 |
| 6. Corolla not distinctly 2-lipped, even if so lower lip spreading ... | 7 |
| Corolla personate ... | 8. <i>Lindernia</i> |

7. Flowers in one axil of the opposite leaves, about 1.5 mm long; stamen 1-locular; minute herb with interlacing stems ... 14. *Microcarpaea*
Flowers in all the axils of the opposite leaves; stamens 2-locular ... 8
8. Corolla violet, 4 mm long; calyx 5-fid; leaves few, basal, almost sessile; oblong obtuse; rather fleshy herb ... 7. *Dopatrium*
Corolla blue; leaves petiolate, spatulate; calyx 3-lobed ... 15. *Glossostigma*
9. Calyx-lobes very unequal, upper usually broadest ... 3. *Bacopa*
Calyx-lobes more or less equal ... 10
10. Calyx 5-nerved, sometimes 5-angled... 11
Calyx more than 5-nerved and anthers 1-locular ... 15
11. Anther loculi separated due to bifurcation of the connective; corolla personate, yellow ... 12. *Lindenbergia*
Anther-loculi not separated as above; corolla usually not yellow ... 12
12. Corolla personate ... 8. *Lindernia*
Corolla may be 2-lipped but lower lip spreading ... 13
13. Corolla 2-lipped; calyx 5-angled ... 4. *Mimulus*
Corolla-lobes sub-equal; calyx not angled ... 14
14. Leaves sessile, ovate-cordate; corolla violet ... 5. *Stemodia*
Leaves not ovate-cordate nor corolla violet; leaves often whorled ... 6. *Limnophila*
15. Corolla much lobed; corolla rosy, tube short ... 11. *Sapubia*
Leaves mostly scaly or linear; corolla-tube narrow abruptly incurved; root-parasites ... 10. *Striga*

VERBASCUM L.

V. chinense (L.) Santapau; *Celosia coromandeliana* Vahl; FBI 4: 251; FUGP 2: 139.

Widespread in Rajasthan. Fls. Dec.-May. Kota: Shahabad Wadhwa et Prosad 9266; 9492; Jhalawar Verma 3311; 3319; 3362.

KICKXIA Dumort.

Plants more or less glabrous or slightly hairy at base; corolla 6 mm long ... 1. *K. ramosissima*
Plants densely hairy; corolla 7 mm long ... 2. *K. incana*

K. ramosissima (Wall.) Janchen *Linaria ramosissima* Wall.; FBI 4: 251; FUGP 2: 140.

Widespread in Rajasthan. Flowers all the year round but chiefly during the rains. Jhalawar Majumder 10413; Wadhwa 3588.

K. incana (Wall.) Pennell *Linaria incana* Wall.; FBI 4: 252; *L. cabulica* Benth. *L. cabulica* var. *pubescens* Hook. f.; FBI 4: 251.

Whole plant including the external surface of the corolla pubescent. Corolla 7 mm long with the upper lip purplish and palate purple spotted, the spur deflexed, straight or only slightly curved forward (Pennell Acad. Nat. Sci. Phil. Mon. 5: 59. 1943).

Widespread in the hilly areas east of the Aravalli. Bundi Verma 1851.

BACOPA Aubl nom. conserv.

1. Herbs prostrate or creeping. Leaf obovate-oblong or cuneate, fleshy; capsule ovoid ... 1. *B. monnieri*
Erect herbs; leaves not fleshy; capsules globose ... 2
2. Flowers solitary, axillary, sessile; placentas separating winged ... 2. *B. procumbens*
Flowers 1-3 together, axillary, pedicelled; placentas combined not winged ... 3. *B. floribunda*

B. monnieri (L.) Pennell *Herpestris monnieri* (L.) Benth.; FBI 4: 272. *Monniera cuneifolia* Michx.; FUGP 2: 142.

Widespread in the wet places; Fls. & frts. Aug.-June. Kota: Shahabad Verma 484; Jhalawar Verma 3382; Wadhwa 5325; Wadhwa et Prosad 9518.

B. procumbens (Mill.) Greenm. *B. hamiltoniana* (Benth.) Wettst. *Herpestris hamiltoniana* Benth.; FBI 4: 272. *Monniera hamiltoniana* Cook; FUGP 2: 142.

In south (Udaipur Majumder 11635) and in south-east part. Fls. & frts. Sept.-Oct. Kota: Shahabad Majumder 13198.

B. floribunda (R. Br.) Wettst. *Herpestris floribunda* R. Br.; FBI 4: 273. *Monniera floribunda* Cook; FUGP 2: 142.

Kota Cook et Gut. Dr. C. D. K. Cook, Director of the Botanical Garden and Institute of Systematic Botany, University of Zurich, kindly send the author a list of their collections from Kota in January, 1976. They have collected some interesting plants from the region that I think is there due to the improvement of the climate as a result of the irrigation project.

MIMULUS L.

M. strictus Benth. ex Pennell. *M. gracilis* Hook. f.; FBI 4: 259; FUGP 2: 143.

In south-east Rajasthan in wet places. Fls. March-May. Jhalawar *Verma* 3339.

STEMODIA L.

S. viscosa Roxb.; FBI 4: 265; FUGP 2: 144.

In south (Udaipur *Majumder* 12499) and in south-east Rajasthan. Fls. & frts. Nov.-Jan. Kota: Chambal river bed *Majumder* 10127.

LIMNOPHILA R. Br.

L. indica (L.) Druce *L. gratioloides* R. Br.; FBI 4: 271; FUGP 2: 146.

In the region east of the Aravalli, common in the swampy places. Fls. & frts. during rainy and also in the cold seasons. Jhalawar: Asnawar *Verma* 6863; Eklera; Manoharthana *Verma* 3444; Sarhod *Wadhwa* 3578; Shahabad, *Wadhwa et Prosad* 9348; *Majumder* 13221.

DOPATRIUM Buch.-Ham.

D. junceum (Roxb.) Buch.-Ham. ex Benth; FBI 4: 274; FUGP 2: 147.

In south (Bhinder *Majumder* 12246) and also in south-east Rajasthan in lakes and marshy places often along with *Oryza nivara* and *Sagittaria* spp. Fls. & frts. Oct.-Nov. Kota: Shahabad *Majumder* 13159; 13210; Baran *Majumder* 10881.

LINDERNIA All.

1. Calyx equalling the capsule or exceeding; leaves uncostate; stamens 4; calyx in flower divided to the middle or less, in fruit split up to the base; almost glabrous herb ...
Capsules twice as long as the calyx or longer; stamens 2; calyx in fruit usually not divided upto the base. ...
2. Leaves multicostate at the base; perfect stamens two; staminodes two; corolla 3-4-times as long as the calyx ...
Leaves uncostate; corolla not 3-times as long as calyx ...
3. Leaves sessile ovate-elliptic or oblong, aristate-serrate; corolla 6-7 mm long; usually white with purple or pink spots; capsule 6 mm long, oblong ...
Leaves broadly elliptic to linear, shallowly and distantly serrate; corolla blue or violet; capsule linear, 1-1.7 cm long ...

1. *L. crustacea*

2

2. *L. hyssopioides*

3

3. *L. ciliata*

4. *L. antipoda*

L. crustacea (L.) F. Muell. *Vandelia crustacea* Benth.; FBI 4: 279; FUGP 2: 149.

In the region east of the Aravalli including Mt. Abu. Fls. Aug.-Nov. Jhalawar: Lotiajhir *Wadhwa* 5475; Bijliya Bhadak *Wadhwa* 7538; Kota: Shahabad *Majumder* 13139; Kota *Majumder* 10852; 12407.

L. hyssopioides (L.) Haines *Illysanthes hyssopioides* Benth.; FBI 4: 283.

In the region east of the Aravalli in moist places. Fls. & frts. Oct.-Dec. Jhalawar: Raipur *Wadhwa* 5478; *Verma* 3322; Kota: Shahabad *Majumder* 13215.

L. ciliata (Colsm.) Pennell *Bonnya brachiata* Link. & Otto; FBI 4: 284; FUGP 2: 151. *B. bracteoides* Blatt. & Hall.

In south (Udaipur *Majumder* 11663 B) and south-east Rajasthan including Mt. Abu. Fls. & frts. July-Nov. Jhalawar-Kota Road *Wadhwa* 7493; Kishanganj *Verma* 710; Shahabad *Majumder* 10481; Kota *Majumder* 10851.

L. antipoda (L.) Alston *Bonnya veronicaefolia* (Retz.) Spr.; FBI 4: 285; FUGP 2: 152. *B. veronicaefolia* var. *verbenae-folia* Hook. f.; FBI 4: 285.

In south-east Rajasthan. Fls. & frts. Sept.-Oct. Kota: Shahabad *Majumder* 10850.

VERONICA L.

V. anagallis-aquatica L.; FBI 4: 293; FUGP 2: 154.

In south (Dungerpur *Verma* 7015) and south-east Rajasthan, in marshy places or in mud. Fls. after rains. Jhalawar: Bakani *Wadhwa* 7046; Piplosa *Verma* 6955.

STRIGA Lour.

- | | | |
|---|-----|---------------------------|
| 1. Calyx 4-5-ribbed | ... | 2 |
| Calyx 10-15-ribbed | ... | 3 |
| 2. Leaves scaly; corolla pink or light purple; whole plant fleshy and reddish-brown | ... | 1. <i>S. gesnerioides</i> |
| Leaves linear; corolla white; plants greenish, not fleshy | ... | 2. <i>S. densiflora</i> |

3. Three ribs of each calyx-lobe terminating at the tip ... 3. *S. angustifolia*
Each lobe of the calyx terminated by a solitary rib; the rest terminated in the sinus ... 4. *S. asiatica*

S. gesnerioides (Willd.) Vatke ex Engl. *S. orobanchioides* Benth.; FBI 4: 299; FUGP 2: 156.

Widespread in Rajasthan (Ajmer *Wadhwa* 4871; Jaisalmer *Wadhwa* 5157; Udaipur *Majumder* 11697; Bhinder *Majumder* 12237), may also be found in our area.

S. densiflora (Benth.) Benth.; FBI 4: 299; FUGP 2: 156.

In the region east of the Aravalli (Ghatoli *Wadhwa* 7557). Fls. during rains and cold season-Duthie. Jhalawar: Dug *Verma* 6716; Eklera *Wadhwa* 7678.

S. angustifolia (Don) Saldanha *S. euphrasioides* (Vahl) Benth.; FBI 4: 299; FUGP 2: 157.

Throughout Rajasthan. Fls. & frts. Oct.-Dec. Kota *Wadhwa* 1972; Jhalawar: Bijliya Bhadak *Wadhwa* 5347; Shahabad *Majumder* 10484; Kota *Majumder* 10888.

S. asiatica (L.) Ktze. *S. lutea* Lour.; FBI 4: 299; FUGP 2: 157.

Throughout Rajasthan (Ghatoli *Wadhwa* 7557). Fls. & frts. Sept.-Dec. Jhalawar: Dug *Verma* 6716; Eklera *Wadhwa* 7678.

SOPUBIA Buch.-Ham. ex D. Don

S. delphinifolia (L.) D. Don; FBI 4: 302; FUGP 2: 159.

Widespread in Rajasthan, in moist place. Fls. & frts. Oct.-Nov. Kota: Shahabad *Majumder* 13211; Kota *Majumder* 13272; 13280.

LINDENBERGIA Lehm.

L. indica (L.) Ktze. *L. urticaefolia* Lehm.; FBI 4: 262; FUGP 2: 160. *L. polyantha* Royle ex Benth.; FBI 4: 262; FUGP 2: 160.

Widespread in Rajasthan. Fls. & frts. almost throughout the year, Jhalawar;

Bager *Verma* 6984; Parshad *Verma* 115; Jhalarpatan *Verma* 3356.

CENTRANTHERA R. Br.

C. nepalensis D. Don *C. hispida* Hook. f.; FBI 4: 301 (non R. Br.); FUGP 2: 158. In the south-east Rajasthan, rather rare; Fls. & frts. Oct.-Nov. Kota: Shahabad *Majumder* 13195.

MICROCARPAEA R. Br.

M. minima (Koehn.) Merr. *M. muscosa* R. Br.; FBI 4: 287; FUGP 2: Kota Cook et Gut. Jan. 1976.

GLOSSOSTIGMA Arn.

G. diandra (L.) O. Ktze. *G. spathulatum* Arn.; FBI 4: 288; FUGP 2: Kota Cook et Gut. Jan. 1976.

OROBANCHACEAE

OROBANCHE L.

O. cernua Loebl. var. **dessertorum** (Beck.) Stapf; FUGP 2: 163. *O. nicotianae* Wt.; FBI 4: 326.

Widespread in Rajasthan; a parasite often on the roots of Brinjal. Dug, Naolekha *Verma* 6730.

UTRICULARIACEAE

UTRICULARIA L.

1. Inflorescence above the water on a whorl of spongy floats, each float tipped with a tuft of filiform pinnae ... 1. *U. inflexa* var. *stellaris*
- Inflorescences without floats on the peduncles ... 2
2. Peduncles stout, pedicels reflexed in fruit bearing usually more than three-flowers; seeds not or scarcely winged ... 2. *U. aurea*
- Peduncles slender; pedicels erect in fruit, bearing 1-3-flowers; seeds distinctly winged ... 3. *U. gibba* ssp. *exoleta*

U. inflexa Forssk. var. **stellaris** (L. f.) Taylor *U. stellaris* L. f.; FBI 4: 328; FUGP 2: 165.

In the south Rajasthan (Banswara *Verma* 215; Looda *Majumder* 10258) may be found in south-east part also. Fls. & frts. Jan.-April.

U. aurea Lour. *U. flexuosa* Vahl; FBI 4: 329; FUGP 2: 166.

In the region east of the Aravalli. Fls. & frts. April-May. Kota: Baran *Verma* 3310; Majauli *Verma* 5609.

U. gibba L. ssp. *exoleta* (R. Br.) Taylor *U. exoleta* R. Br.; FBI 4: 329; FUGP 2: 166.

In the region east of the Aravalli. Fls. & frts. April-May. Kota: Shahabad *Verma* 3305.

GESNERACEAE

DIDYMOCARPUS Wall.

D. pygmaea C. B. Clarke in FBI 4: 345.

Kota-Singh in *J. Bombay nat. Hist. Soc.* 69 (3): 687, 1972.

BIGNONIACEAE

DOLICHANDRONE Seem.

D. falcata var. *lawii* (Seem.) Haines. *D. falcata* Seem.; FUGP 2: 172. *D. lawii* Seem.; FBI 4: 380.

In south-east Rajasthan. Fls. May. Kota: Kushiara village *Wadhwa* 9274. There are number of cultivated species of which *Tecomastans* (L.) HBK. (Bundi *Verma* 1902; Patan *Verma* 6905) is widespread. It is a shrubby plant with pinnate leaves and yellow flowers. It is a native of S. America. *Millingtonia hortensis* L. f. (Akashneem, Chambeli) is a tall tree with white flowers in terminal panicles. Leaves bi- or tri-pinnate and corolla tube very narrow but long.

PEDALIACEAE

SESAMUM L.

S. orientale L. *S. indicum* L.; FBI 4: 357; FUGP 2: 175.

Common in the forests in the region east of the Aravalli, also cultivated. Jhalawar

Wadhwa 7459; Kota: Shahabad *Majumder* 13119; Jhalawar *Wadhwa et Prosad* 9576; Kishangunj *Verma* 711.

MARTYNIACEAE

MARTYNIA L.

M. annua L. *M. diandra* Glox.; FBI 4: 386; FUGP 2: 176.

Widespread in Rajasthan by the roadside and in the waste places. Native of Mexico. Fls. Aug.-Sept. Frts. ripen Dec.-Feb. Parshad *Verma* 122; Jhalarpatan *Wadhwa* 5398.

ACANTHACEAE

1. Leaves in a whorl of 4; bracts spiny or with retrorse bristles; seeds on retinacula; inflorescences strobiloid spike or heads ... 2. *Blepharis*
- Leaves not in true whorls, even if in pseudowhorls upper leaves bract-like, inconspicuous ... 2
2. Herbs almost stem-less except scape-like spike; leaves mostly radical, obovate or oblanceolate, alternate; peduncles with imbricated chappy-scales; bracts may be spiny or pungent ... 1. *Elytraria*
- Stem well developed and leafy throughout ... 3
3. Bracts with white scarious margins, never spiny; prostrate or erect herbs; anthers 2-celled, one cell higher up the other and lower with spur-like process at the base ... 4
- Bracts accompanied by spines or thorns, if not calyx 5-lobed and spikes not one-sided ... 5
4. Spikes one-sided; bracts heteromorphic or of one type; calyx 5-partite ... 17. *Rungia*
- Spikes cylindrical or 4-sided; calyx 4-partite; bracts all similar ... 14. *Rostellularia*
5. Flower-clusters spiny or thorny; but never with retrorse bristles ... 6
- Flowers not accompanied by spines nor bracts spiny ... 8
6. Bracts and bracteoles spiny tipped; flowers often in large globular heads or head near the base or rarely in the aerial part ... 13. *Lepidagathis*
- Bracts and bracteoles accompanied by spines or thorns ... 7
7. Corolla bilabiate, blue; thorns present simple ... 3. *Hygrophila*
- Corolla-lobes sub-equal, yellow, white or even bluish ... 12. *Barleria*
8. Flowers in heads; herbs ... 9
- Flowers not arranged in head; herbs or shrubs ... 10

9. Heads several flowered, subtended by an involucre of 4-leafy bracts; stems with simple hairs mixed up with yellow cilia, indumentum usually reflexed ...
 Heads 1-3-flowered, subtended by a part of leafy bracts; stems with white simple hairs ...
10. Spikes axillary and terminal ...
 Flowers in axillary clusters or in cymes ...
11. Corolla bilabiate; herbs ...
 Corolla showy large, lobes sub-equal or bilabiate; shrubby plants ...
12. Stamens-2; seeds 20- or more in a fruit ...
 Stamens 4; seeds usually 8-10 per fruit ...
13. Bracts linear ...
 Bracts foliaceous, large ...
14. Corolla exerted out of the white bracts with green reticulations; stamens-2 ...
 Stamens-4 or if 2, corolla not exerted nor bracts white ...
15. Stamens-4; flowers subtended by ovate-acuminate bracts ...
 Stamens-2 ...
16. Bracts and bracteoles green, margins e-ciliated ...
 Bracts and bracteoles with ciliated margins ...
17. Flowers more or less in axillary clusters ...
 Flowers on elongated axis, often paniculate ...
18. Shrubby plants; flowers accompanied by ovate-acuminate scarious bracts; seeds hairy ...
 Small bushy plants or trailing, herbaceous; bracts and bracteoles narrow ...
19. Seeds verrucose, echinulate or papillose, corolla 2-lipped ...
 Seeds without any outgrowths, only with microscopic hairs; flowers 1-3, axillary; corolla-lobes sub-equal, a long trailing herb ...
20. Flowers on one side of the axillary racemes, glandular hairy; small erect herb ...
 Flowers on paniculate cymes, both axillary and terminal; a large trailing herb ...
8. *Gentelbua* ...
 7. *Hemigraphis* ...
 4. *Hemiadelphis* ...
 5. *Physichilus* ...
 12. *Barleria* ...
 10. *Eranthemum* ...
 9. *Petalidium* ...
 15. *Adhatoda* ...
 12. *Barleria* ...
 9. *Petalidium* ...
 18. *Dicliptera* ...
 6. *Dipteracanthus* ...
 11. *Andrographis* ...
 16. *Peristrophe* ...

ELYTRARIA Michx. nom. conserv.

- E. acaulis** (L. f.) Lindau *E. crenata* Vahl;
 FBI 4: 394; *Tubiflora acaulis* Ktze.;
 FUGP 2: 180.

In the region east of Aravalli. Fls. & frts. Oct.-Nov. Kota: Shahabad Majumder 13167; 13231; Verma 625; Chandrapura Verma 1821; Kota Wadhwa 1961; Jhalawar: Bijliya Bhadak Wadhwa 7432.

BLEPHARIS JUSS.

- B. maderaspatensis** (L.) Heyne ex Roth *B. boerhaviaefolia* Pers.; FBI 4: 478; FUGP 2: 183.
 Throughout Rajasthan. Fls. & frts. Oct.-Jan. Jhalawar: Asnawar-Malatoda Verma 6884; Sarhod Wadhwa 3559.

HYCROPHILA R. BR.

- H. auriculata** (Schum.) Heine *H. spinosa* T. And.; FBI 4: 408. *Asteracantha longifolia* (L.) Nees; FUGP 2: 184.
 Throughout Rajasthan in swampy places. Fls. & frts. June-Jan. Kota: Shahabad Wadhwa 9341; Dug Verma 6704; Jhalawar Majumder 10098; Kota Majumder et Misra 10430; Shahabad Majumder 13177.
Dyschoriste vagans Ktze. has also been reported from the adjoining area, may be found in south-east part also. It is closely related to *Hygrophila* from which it differs having lesser number of seeds (usually 4) per fruit.

HEMIADELPHIS Nees

- H. polyspermus** Nees *Hygrophila polysperma* (Roxb.) T. And.; FBI 4: 406; FUGP 2: 185.
 In south (Rampura Verma 1792; Dunderpur Verma 167; Banswara Verma 213) and also in south-east Rajasthan. Fls. & frts. Dec.-April. Hindoli Verma 1893.

PHYSICHILUS Nees

- P. serphyllum** Nees *Hygrophylla serpyllum* (Nees) T. Anders.; FBI 4: 406; FUGP 2: 186.
 In south (Chittor Majumder 10404; Marwa Verma 162; Jaisamand Verma 49), and south-east Rajasthan in most places. Fls. & frts. Dec.-April. Kota: Eklara Majumder 10029; Verma 3421; Kota Wadhwa 9355; Chappi river Wadhwa 9528; Jhalawar Verma 3378.

DIPTERACANTHUS Nees

Capsule pubescent; internodes long, almost glabrous; fls. greyish-pale-mauve-violet, corolla tube short ... 1. *D. prostratus*
 Capsule glabrous below the tip; internodes short pubescent; fls. purplish-white; corolla tube long ... 2. *D. patulus*

D. prostratus (Poir.) Nees *Ruellia prostrata* var. *dejecta* C. B. Clarke in FBI 4: 411; FUGP 2: 187.

Throughout Rajasthan. Fls. & frts. Sept.-March. Kota: Shahabad Verma 621; 423; Majumder 13247.

D. patulus (Jacq.) Nees *Ruellia patula* Jacq.; FBI 4: 421; FUGP 2: 188. *R. patula* var. *alba* Saxton.

Throughout Rajasthan. Fls. & frts. Sept.-Dec. Kokanda-Denwas Wadhwa 5433.

HEMIGRAPHIS Nees

H. rupestris Heyne ex T. Anders. *H. latebrosa* var. *rupestris* C. B. Clarke in FBI 4: 423; FUGP 2: 191.

In south-east Rajasthan. Fls. Nov.-Dec. Kota: Bandi Verma 1751.

GANTELBUA Bremek.

G. urens (Heyne) Bremek. *Hemigraphis dura* T. And.; FBI 4: 422; FUGP 2: 190.

In south-east Rajasthan. Closely resembling this is *Hemigraphis hirta* T. And., a softly pubescent herb with pale blue fls. Hairs of one type and heads subtended by a pair of leaves. Fls. & frts. Jan.-April. Jhalawar Wadhwa 9569; Eklera, Manohar-thana Verma 3452.

PETALIDIUM Nees

P. barlerioides Nees; FBI 4: 416; FUGP 2: 192.

In south-east and in Mt. Abu. Fls. May. Kota: Khunda-Koh Wadhwa et Prosad 9236; Jhalawar: Ghora Pasad river Verma 348.

ERANTHEMUM L.

Bracts elliptic-ovate, cuspidate, nearly glabrous, white with green nerves; spikes 2.5-7.5 cm long, in close panicles; corolla deep blue ... 1. *E. nervosum*

Bracts obovate-obtuse or broadly ovate, obtuse, white with green veins, mucronate or shortly apiculate, gland-strigose; spikes 7.5 cm long or longer, in panicles, often solitary; corolla rose-coloured ... 2. *E. roseum*

E. nervosum (Vahl) R. Br. *Daedalacanthus nervosum* T. And.; FBI 4: 418; FUGP 2: 193.

Throughout Rajasthan. Fls. May-June. Kota Wadhwa et Prosad 9246.

E. roseum (Vahl) R. Br. *Daedalacanthus roseum* T. And.; FBI 4: 419.

In south (Chittor Majumder 10404; Orai dam site Verma 1687; Majharia-Deoghar Verma 279) and in south-east Rajasthan. Fls. & frts. Dec.-April. Jhalawar: Asnawar-Malatoda forest Verma 6886.

ANDROGRAPHIS Wall.

A. echioides (L.) Nees; FBI 4: 505; FUGP 2: 191.

Throughout Rajasthan. Fls. & frts. Oct.-Dec. Jhalawar: Sarhod Wadhwa 3577; Khanpura Verma 6980.

BARLERIA L.

1. Prickly shrubs or undershrubs; outer calyx-segments spiny; capsule 2-seeded; bracts leafy, ending in a spine; bracteoles spine-pointed; corolla orange-yellow or cream coloured ... 1. *B. prionitis*
2. Bracteoles linear, 12 mm long, toothed; sepals unequal, outer 2.5 cm long, margins sub-spinous bristle-tipped, reticulate ... 2. *B. cristata*
- Outer sepals leafy, unequal, entire; fls. solitary, rose-purple ... 3. *B. prattensis*

B. prionitis L.; FBI 4: 484; FUGP 2: 200. *B. prionitis* var. *diacantha* Blatt. et Hall.

Throughout Rajasthan. Fls. & frts. Aug-Jan. Kota: Shahabad Verma 640; Jhalawar: Lotiajhir Wadhwa 5482; Eklera Wadhwa 7600.

B. cristata L.; FBI 4: 488; FUGP 2: 201.

Throughout Rajasthan (Chittor *Verma* 1639; Kalakhet *Verma* 1738), may be available in south-east part also. Fls. & frts. Nov.-Dec.

B. prattensis Santapau

Suffruticose glabrous shrub. In the region east of the Aravalli, mainly in the *Anogeisus pendula* forests. Fls. & frts. Oct.-Dec. Jhalawar: Khanpur-Bager *Verma* 1736; Sarhod *Wadhwa* 3571; Kota *Majumder* 10837; 10853.

LEPIDAGATHIS Willd.

Leaves with 3-parallel nerves; bracts with spines almost of their length; spikes basal, globose, spiny, may be on the upper branches also ...

Leaves with one midnerve, other nerves radiating from it (pinnate); bracts broadly ovate; spikes basal globular, spiny, long white-hairy ...

1. *L. trinervis*2. *L. hamiltoniana***L. trinervis** Nees; FBI 4: 517; FUGP 2: 204.

Throughout Rajasthan. Fls. & frts. Sept.-April. Jhalawar: Sarhod *Wadhwa* 3541.

L. hamiltoniana Wall.; FBI 4: 517; FUGP 2: 204.

Throughout Rajasthan. Fls. & frts. Oct.-Jan. Jhalawar: Dug *Verma* 6763; Parsad *Verma* 131. *Hypoestis lanata* Dalz. also collected from Kota by Cook *et* Gut. It is an undershrub; flower 2.5 cm long; stamens 2; anther 1-locular; ovary locule 2 ovuled.

ROSTELLULARIA Reichb.

1. Bracts and bracteoles as long as or longer than the calyx-lobes ...
Bracts and bracteoles shorter than the calyx-lobes, all with green midrib and scarious margins ...
2. Bracts and bracteoles linear or lanceolate, green, pectinately white ciliate on the margins, scabrous, hirsute; calyx-lobes narrowly lanceolate, margins scarious ...
Bracts and bracteoles slender, hairs few only on the apical region, otherwise glabrous, longer than the calyx; calyx-lobes similar only apiculate; leaves ovate-elliptic, up to 5 cm long ...

1. *R. crinita*

3. Bracts over 2.5 mm broad; bracteoles and calyx-lobes narrower, all scarious margined with soft whitish jointed hairs along the margins; leaves ovate or oblong, even linear, up to 2.5 cm long ...

2. *R. pumila*

- Bracts and bracteoles lanceolate or linear; less than 2.5 mm broad; leaves elliptic-lanceolate or linear, up to 5.5 cm long; spikes scarcely 3 cm long ...

3. *R. procumbens*

4. Bracts, bracteoles and calyx-lobes obtuse, glabrous; leaves elliptic-oblong or lanceolate, obtuse; spikes slender, often very long; the floral whorls distant ...

4. *R. quinquangularis*

Bracts, bracteoles and calyx-lobes acute; bracts and bracteoles lanceolate, nearly 2.5 mm long but much shorter than the calyx-lobes, all finely densely hairy on the margins; prostrate herb ...

5. *R. prostrata***R. crinita** Nees *Justicia micrantha* Heyne ex Clarke p.p.; FBI 4: 536.

In the region east of the Aravalli. Fls. & frts. Oct.-Jan. Kysra *Verma* 6794; Dug *Verma* 6767; Kota Kajalia *Wadhwa* 3593; Bijliya Bhadak *Wadhwa* 7425; Kota: Shahabad *Majumder* 13295; 13279; 10872; Shahabad *Verma* 473; 683.

R. pumila Nees in DC. Prodr. 11: 372, 1849; Majumder in Bull. bot. Soc. Beng. 25 (1 & 2): 75, 1971. *Justicia simplex* D. Don (non *Rostellularia simplex* Wt.); FBI 4: 539; FUGP 2: 210.

Widespread in Rajasthan but not common anywhere. Fls. Nov.-Dec. Kota: Shahabad *Majumder* 13141.

R. procumbens (L.) Nees *Justicia procumbens* L.; FBI 4: 539.

Widespread in Rajasthan. Fls. & frts. Aug.-Dec. Jhalawar *Wadhwa* 7577.

- 2 **R. quinquangularis** Nees *Justicia quinquangularis* Koen ex Roxb.; FBI 4: 536; FUGP 2: 209.

- 4 In the region east of the Aravalli in the swampy places. Fls. & frts. Aug.-Oct. Kota: Kishanganj *Verma* 679; Sitabari forest *Wadhwa* 928.

3

R. prostrata (C. B. Clarke) Majumder *Justicia diffusa* var. *prostrata* C. B. Clarke in FBI 4: 538. *J. prostrata* Gamble.

In the region east of the Aravalli (Jaipur *Wadhwa* 4822; Chittor *Verma* 1607; 1606), in shady or grassy places. Fls. & frts. Aug.-Dec. Kota: Shahabad *Verma* 473; Kishanganj *Verma* 683; Kapildhara, Puraniya *Verma* 761; Kota *Wadhwa* 1967.

ADHATODA Nees

A. vasica (L.) Nees; FBI 4: 540; *Justicia adhatoda* L.; FUGP 2: 207.

Throughout Rajasthan. Fls. & frts. Feb.-June. Kota: Shahabad *Wadhwa et Prosad* 9253.

PERISTROPHE Nees

P. bicalyculata (Retz.) Nees; FBI 4: 554; FUGP 2: 210.

Throughout Rajasthan. Fls. & frts. Sept.-Feb. Jhalawar: Asnawar *Verma* 6914; Shahabad *Majumder* 13232.

RUNGIA Nees

Bracts of one type, 6 mm long; corolla 6-12 mm long, white or violet with purple spots, upper lip emarginate

Bracts dimorphic, 3-4 mm long; corolla 5 mm long, white or bluish, upper lip entire ...

... 1. *R. repens*

2. *R. pectinata*

R. repens Nees; FBI 4: 549; FUGP 2: 211.

Throughout Rajasthan, particularly in the forest tract. Fls. & frts. Oct.-Dec. Jhalawar *Wadhwa* 5495; *Majumder et Misra* 10088; Khanpura, Piplosa *Verma* 6731; 6928; Shahabad *Majumder* 10476.

R. pectinata (L.) Nees *R. parviflora* var. *pectinata* C. B. Clarke et var. *muralis* C. B. Clarke in FBI 4: 550; FUGP 2: 212.

Throughout Rajasthan. Fls. & frts. Nov.-May. Jhalawar: Manoharthana *Verma* 3524; Khanpura, Piplosa *Verma* 6950; Khunda-Koh *Wadhwa* 9245.

DICLIPTERA Juss.

D. verticillata (Forssk.) Christens. *D. micrantha* Nees; FBI 4: 553; FUGP 2: 213. In Mt. Abu and in south Rajasthan

(Dungerpur *Majumder* 10334; Chittor *Verma* 1691; Bansi *Verma* 1721), may also be found in south-eastern part.

VERBENACEAE

1. Leaves digitate; inflorescence cymose, centrifugal, lax; corolla 2-lipped; stamens 2+2; drupe with 1 pyrene ... 5. *Vitex*
- Leaves simple, opposite or whorled, corolla various; stamens 2-4; fruit various ... 2
2. Flowers on spikes, centripetal; pyrenes 2-1 or fruit drupaceous ... 3
- Flowers cymose or in large paniculate clusters ... 5
3. Calyx small, 2.5 mm long or less ... 4
- Calyx 6 mm long or longer; flowers in involucre pedunculate heads, fragrant; corolla tube orange; a shrub or small tree ... 3. *Nyctanthes*
4. Calyx truncate or obscurely bilobed; fruit drupaceous succulent, indehiscent; aromatic shrub with simple hairs and prickly stems ... 1. *Lantana*
- Calyx deeply bilobed; leaves with medi-fixed hairs; a prostrate, unarmed and scentless herb, fruit capsular ... 2. *Phyla*
5. Tree; corolla regular, white; stamens isomerous, included; calyx accrescent in fruit; leaves very large and also the inflorescence ... 4. *Tectona*
- Shrubby plants; corolla 2-lipped, white or reddish; stamens exserted; cymes dichotomous aggregated in panicles; calyx sometimes accrescent ... 6. *Clerodendrum*

LANTANA L.

L. camara L.; FBI 4: 562; FUGP 2: 216.

Throughout Rajasthan. Fls. in greater part of the year. Native of America. Jhalawar *Verma* 3336; Jhalarpathan *Verma* 6904.

PHYLA Lour.

P. nodiflora (L.) Greene *Lippia nodiflora* (L.) Rich.; FBI 4: 563; FUGP 2: 217.

Throughout Rajasthan. Fls. & frts. through greater part of the year. Jhalawar *Verma* 3328; Kota *Wadhwa* 9358; Jhalawar: Piplosa *Verma* 6954; Hathi Khedi block *Verma* 7672.

NYCTANTHES L.

N. arbor-tristis L.; FBI 4: 603; FUGP 2: 24 (under *Oleaceae*).

Very common throughout the forest tracts in Rajasthan, particularly in the region east of the Aravalli. Fls. Aug.-Oct. Asnawar Verma 6878.

Local name: Harshingar.

TECTONA L. f. *nom. conserv.*

T. grandis L. f.; FBI 4: 570; FUGP 2: 220.

In the forest tract east of the Aravalli, particularly in the Banswara, Pratapgarh and Shahabad regions. Fls. & frts. Aug.-Oct. Lotiajhir Wadhwa 5496; Kapildhara, Purniya Verma 772.

Local name: Sagun, Saigun, Saj.

VITEX L.

V. negundo L.; FBI 4: 583; FUGP 2: 224.

Throughout Rajasthan. Fls. during greater part of the year. Parshad Verma 124; Shahabad Verma 489; Bakani, Kalisind Verma 6998; Kota Wadhwa 9271; Jhalawar Majumder 10089.

Local name: Nishinda.

CLERODENDRUM L.

Calyx-lobes long, divided half way down, ovate-acuminate; leaves opposite, less than 7.5 cm long ...

1. *C. multiflorum*

Calyx-lobes very short, broadly triangular; leaves often in a whorl of 3, reaching more than 15 cm long, nearly sessile; panicle terminal ...

2. *C. serratum*

C. multiflorum (Burm. f.) Ktze.; *C. phloemides* L. f.; FBI 4: 590; FUGP 2: 225.

Throughout Rajasthan. Fls. & frts. throughout the year. Jhalarpatan Wadhwa et Prosad 9487; Ahu river bed Wadhwa 9486.

C. serratum (L.) Moon, FBI 4: 592; FUGP 2: 226 (under authorship of Spr.).

In the region east of the Aravalli. Fls. April-Aug. Jhalawar Wadhwa 1942.

LABIATAE

1. Perfect stamens 4; anther locules not on long connective ...
- Perfect stamens 2; anther-locules very unequal or solitary on a long connective that is affixed a little above the sterile lobe to the filament ...

2

11. *Salvia*

2. Anther-locules confluent ... 3
- Anther-locules not confluent (except in *Leucus*) ... 6
3. Leaves not lobed forming linear segments; corolla with 4 of the lobes equal or the two upper connate, the lower lip dissimilar, upper calyx-lobe usually broadest ... 4
- Leaves pinnati-sect, segments linear; corolla 2-lipped; lower lip 3-partite, lobes spreading; flowers in simple branched spikes; calyx 13-15 nerved; stamens included ... 4. *Lavandula* 5
4. Lower lip of corolla flat ... 3. *Hyptis*
- Lower lip of corolla concave or boat-shaped; flowers in small axillary clusters; calyx-teeth pungent ... 1. *Ocimum*
5. Stamens exserted; upper calyx-teeth very large, decurrent; fragrant herbs ... 2. *Orthosiphon* 7
- Stamens included; fruiting calyx deflexed, 2-4-lower calyx-teeth awned, subulate, larger; herbs not fragrant ... 8
6. Anthers one-loculed; shrubs ... 5. *Pogostemon*
- Anthers 2-loculed; stamens distinctly unequal herbs ... 6. *Colebrookia*
7. Calyx 5-toothed; stamens exserted, filaments usually hairy; corolla subequally 4-fid; panicles, made up of bracteate spikes or racemes, leaves opposite ... 7. *Nepeta* 9
- Calyx 5-partite, segments plumose; stamens included; spikes cylindrical, paniculate, bracts small; flowers seem to be continuous forming white spike; leaves and branches often whorled ... 10
8. Upper pair of stamen larger; flowers in branched panicles; anther-cells divergent; calyx tubular, 5-toothed ... 8. *Anisomeles*
- Lower pair of stamen longest ... 9. *Leucus*
9. Upper lip of corolla hooded, villous; calyx 8-10 toothed ... 10. *Leonotis*
- Upper lip of corolla flat, stamens exserted; calyx 5-nerved, 5-toothed; flowers reddish, bisexual; leaves 2.5 cm long or longer, ovate, serrate, acute ...
10. Lower lip of corolla very large, white; corolla usually under 2.5 cm long, white; floral whorls loose or large globose, bracteate; calyx teeth and bracts not spinescent ...
- Lower lip of corolla very small; corolla 2.5 cm long, orange-red; calyx-teeth spinescent; floral-whorls globose distant; bracts spinescent ...

OCIMUM L.

Pedicels as long as or longer than the calyx; calyx 4 mm long; corolla hardly longer than calyx ...

1. *O. sanctum*

2. *O. basilicum*

O. sanctum L.; FBI 4: 609; FUGP 2: 233. Throughout Rajasthan. Fls. Oct.-Jan.

Jhalawar *Majumder* 10106; Eklera *Wadhwa et Prosad* 9605; Kota *Majumder* 10128.

Local name: Tulsi, Krishna tulsi.

O. basilicum L.; FBI 4: 608; FUGP 2: 235.

Throughout Rajasthan. Fls. & frts. Aug.-Dec. Kota: Shahabad *Verma* 619; Jhalawar: Bijliya Bhadak *Wadhwa* 7539.

Local name: Kali tulsi, Babui tulsi.

ORTHOSIPHON Benth.

O. pallidus Royle ex Benth.; FBI 4: 613; FUGP 2: 236.

In the south-east Rajasthan. Fls. & frts. Aug.-Sept. Kota: Sahabad *Verma* 622; 472.

HYPTIS Jacq.

H. suaveolens Poit.; FBI 4: 630.

Trop. America. In the south-east Rajasthan. Fls. Nov.-Dec. Chandrapura *Verma* 1843.

LAVANDULA L.

L. bipinnata (Roth) Ktze. var. **rothiana** Ktze.

L. burmanni Benth.; FBI 4: 631; FUGP 2: 240.

In south (Bansi *Majumder* 12333; Dharia-bad *Majumder* 12362) and in south-east Rajasthan; also reported from N. W. Rajasthan. Fls. & frts. Oct.-Nov. Kota: Chambal river side *Majumder* 10107.

POGOSTEMON Desf.

P. benghalense (Burm. f.) Ktze. *P. plectranthoides* Desf.; FBI 4: 632; FUGP 2: 241.

In the region east of the Aravalli including Mt. Abu. Fls. & frts. Dec.-Feb. Manoharthana *Verma* 3516; Bundi-Chittor Rd. *Majumder* 10415.

COLEBROOKEA Sm.

C. oppositifolia Sm.; FBI 4: 642; FUGP 2: 243.

In the region east of the Aravalli. Fls. May-June. Kota: Khunda-Koh *Wadhwa* 9239.

NEPETA L.

N. hindostana (Roth) Haines *N. rudiralis* Buch.-Ham. ex Hook. f.; FBI 4: 661; FUGP 2: 254.

In the region east of the Aravalli including Mt. Abu. Fls. & frts. April-May and also in Nov.-Dec. Manoharthana *Verma* 3525; 3520; Pirawa *Verma* 6852.

ANISOMELES R. Br.

A. indica (L.) Ktze. *A. ovata* R. Br.; FBI 4: 672; FUGP 2: 215.

Throughout Rajasthan. The genus *Epi-meredi* Adans (1768) is congeneric to *Anisomeles* according to Rothmaler (Fedde's Rept. 53: 12, 1944) but Bakh. f. in *Fl. Java* 2: 623, considered them separable. Hence genus *Anisomeles* needs conservation and probably retypification. Pirawa *Verma* 6811.

LEUCUS R. Br.

1. Calyx-tube straight; flowers pedicellate, in axillary whorls, whorls 2-4-flowered; leaves ovate, elliptic or oblong, petiolate ... 4 *L. biflora*
- Calyx-tube curved; flowers more than 4 in a whorl ... 2
2. Calyx-mouth produced on the upper side, split above; leaves linear, margin entire, pubescent; floral whorls small; calyx about 6 mm long, teeth minute; corolla-tube scarcely exerted ... 1. *L. urticaefolia*
- Calyx 8-20 mm long; corolla exerted ... 3
3. Bracts 1.5-2.5 cm long, awned, imbricating and forming an involucre covering the large terminal flower-heads; leaves ovate or ovate-lanceolate, crenate-serrate, glandular punctate below; calyx about 2 cm long, pubescent near mouth; corolla about 2.5 cm long; a tall herb ... 2. *L. cephalotes*
- Bracts about 1 cm long, neither imbricating nor involucre; calyx 8-10 mm long; corolla about 15 mm long; leaves oblong or oblong-lanceolate, serrate, pubescent; a dwarf annual herb ... 3. *L. nutans*

L. urticaefolia (Vahl) J. Don.; FBI 4: 680; FUGP 2: 249.

Widespread in Rajasthan. Fls. & frts. Sept.-Oct. Jhalawar: Misroli *Wadhwa* 7648; Baran *Majumder* 12494.

L. cephalotes Spreng.; FBI 4: 689; FUGP 2: 251.

Throughout Rajasthan. Fls. & frts. Sept.-Dec. Jhalawar: Khanpur-Piplosa *Wadhwa* 6935; Dug-Naolekha *Verma* 6735; Jhalawar *Wadhwa* 7435.

L. nutans (Roth) Spreng.; FBI 4: 688; FUGP 2: 251.

In south (Chittor *Verma* 1678) and south-east Rajasthan. Fls. & frts. Sept.-Dec. Jhalawar: Sarhod *Wadhwa* 7699.

L. biflora (Vahl) R. Br.; FBI 4: 688.

In south (Orai dam site *Verma* 1692; 1688) and in south-east Rajasthan including Mt. Abu. Fls. & frts. Jan.-May. Kota: Rupi river *Wadhwa et Prosad* 9333; Eklera *Verma* 7614.

LEONOTIS R. Br.

L. nepetaefolia (L.) Ait. f.; FBI 4: 691; FUGP 2: 253.

In south (Bansi *Verma* 1727) and south-east Rajasthan. Fls. & frts. Sept.-Dec. Jhalawar: Kyasra *Verma* 6785; Jhalarpatan *Verma* 6990.

SALVIA L.

S. plebeia R. Br.; FBI 4: 655; FUGP 2: 256.

In south (Banswara *Majumder* 10219; *Verma* 212) including Mt. Abu, may also be available in the south-eastern part. Fls. & frts. Sept.-April.

NYCTAGINACEAE

Annual or perennial diffuse herb; flowers in capitula or lax cymes; fruit narrowly obovoid, 3-5-ribbed, smooth or minutely glandular ...
Perennial herb with climbing or scrambling stems; flowers in umbels or verticels; fruit clavate, obscurely ribbed with large scattered mucilaginous glands ...

1. *Boerhavia*

2. *Commicarpus*

BOERHAVIA L.

B. diffusa L.; FUGP 3: 2; *B. repens* L. et var. *diffusa* (L.) Boiss.; FBI 4: 709 (in-

cluding var. *procumbens* Hook. f. in FBI l.c.).

Widespread in Rajasthan in various forms. Fls. & frts. Sept.-May. Kokanda-Denwas *Wadhwa* 5446; Bijliya Bhadak *Wadhwa* 7644; Jhalawar *Verma* 3523; Kota *Wadhwa* 9471; 1996.

COMMICARPUS Standl.

C. chinensis (L.) Heimer. *Boerhavia repanda* Willd.; FBI 4: 709; FUGP 3: 3.

Widespread in Rajasthan (Udaipur *Majumder* 10364), may be available in south-eastern part also. Fls. Sept.-June. Of the cultivated plants *Bougainvillea* spp. and *Mirabilis jalapa* L., are very common.

AMARANTHACEAE

- | | |
|--|-------------------------|
| 1. Leaves alternate, if not mixed (<i>Aerva</i>) ... | 2 |
| Leaves opposite ... | 5 |
| 2. Ovary with several ovules; style one, stigma capitate; fruit circumsciss; flowers glabrous, bisexual, in terminal, often peduncled spikes; filaments united into a tube ... | 1. <i>Celosia</i> |
| Ovary with solitary ovule; other characters variable ... | 3 |
| 3. Flowers almost glabrous; staminodes none; filaments free ... | 4 |
| Flowers densely white hairy; stamens 4-5, pseudostaminodes present; leaves alternate or fascicled or alternate and opposite mixed, never all opposite ... | 5. <i>Aerva</i> |
| 4. Racemes elongated, axillary, fertile flowers at the base of the racemes, accompanied by 2-sterile ones represented by crested scales, bisexual; stigmas 1-2 on distinct style; fruit crustaceous nuts ... | 2. <i>Digera</i> |
| Flowers unisexual, not accompanied by sterile ones; stigmas 2-3, sessile, filiform; fruit indehiscent or circumsciss ... | 4. <i>Amaranthus</i> |
| 5. Flowers accompanied by hooked spines; pseudostaminodes none ... | 3. <i>Pupalia</i> |
| Flowers without hooked spines ... | 6 |
| 6. Flowers erect; anthers unilocular ... | 7 |
| Flowers glabrous, on hairy pedicels, bent back and downwards; anthers 2-celled; style one, capitate; stamens with interposed pseudostaminodes; bracteoles spiny-tipped ... | 6. <i>Achyranthes</i> |
| 7. Stigma one, capitate; flowers in axillary spikes; hairs simple, dentate or aristulate-glochidiate and on the perianth only; staminal cup small, hardly over 1.5 mm long; filaments free above the cup ... | 7. <i>Alternanthera</i> |

Stigmas-2, linear; flowers in globose or cylindrical spikes, terminal; perianth with woolly hairs, staminal tube long; filaments almost united their whole length ...

8. *Gomphrena*

CELOSIA L.

C. argentea L.; FBI 4: 714; FUGP 3: 7.

C. cristata L. *C. coccinea* L.

Widespread in Rajasthan-wild and cultivated. Fls. & frts. Aug.-Jan. Bhowanimandi Verma 3502; Bakani Kalisind Verma 7035; Dug-Naolekha Verma 6717; Daosa Wadhwa 8136; Jhalawar Wadhwa 7446.

DIGERA Forssk.

D. muricata (L.) Mart. *D. arvensis* Forssk.; FBI 4: 717; FUGP 3: 8.

Widespread in Rajasthan. Flowers usually after rains are over-Duthie l.c. Jhalawar Wadhwa 7619; Khanpara Wadhwa 9587; Shahabad Verma 466.

PUPALIA Juss.

P. lappacea (L.) Juss.; FBI 4: 724; FUGP 3: 19.

Widespread in Rajasthan. Fls. & frts. Aug.-May. Jhalawar Wadhwa 7589; 7488; Shahabad Wadhwa 9257; Bager Verma 697.

AMARANTHUS L.

1. Plants spiny; bracts shorter than the flowers; panicles terminal ...
2. Plants unarmed; panicles axillary or axillary and terminal ...
3. Inflorescences axillary and terminal ...
4. Flowers in axillary clusters ...
5. Perianth 3 ...
6. Perianth 4-5; bracts and bracteoles long awned much exceeding the awned sepals; sepals oblong not overlapping, 0.2-0.5 mm wide; utricle exceeding the sepals urceolate, circumsciss ...
7. Perianth hardly mucronate; ripe fruits irregularly bursting and falling with the perianth, strongly rugose, seed containing part entirely covered by perianth from which seedless conical part protruded ...
8. Perianth long awned, awn almost the length of the body; bracteoles awned but not exceeding the perianth in length; ripe fruit circumsciss, persistent ...

1. *A. spinosus*

2

3

5

4

4. *A. hybridus*

2. *A. viridis*

3. *A. tricolor*

5. Perianth 3, acuminate, slightly shorter than the rugose circumsciss utricle; stamens 3 ...

5. *A. graecizans*

Perianth 2, subacute; stamens 2; utricle compressed, smooth, indehiscent ...

6. *A. tenuifolius*

A. spinosus L.; FBI 4: 718; FUGP 3: 10.

Widespread in Rajasthan. Fls. & frts. Aug.-Dec. and May-June. Kota: Bundi Verma 1840; Chandrapura Verma 1823; Bhowanimandi 3499; Kokanda Denwas Wadhwa 5457 A.

A. viridis L.; FBI 4: 720; FUGP 3: 13.

Widespread in Rajasthan. Fls. & frts. during rainy and cold season. Banki block Verma 23; Bundi Verma 1409.

A. tricolor L. *A. mangostanus* L.; FBI 4:

720. *A. polygamus* L. (not of Hook. f.) *A. gangeticus* L.; FBI 4: 719; FUGP 3: 12.

Usually cultivated or as an escape. Fls. & frts. Sept.-Dec. Jhalawar: Bijliya Bhadak Wadhwa 5360.

A. hybridus L. ssp. *hybridus* *A. frumentaceus* Buch.-Ham.; *A. paniculatus* sensu Hook. f.; FBI 4: 718; FUGP 3: 11.

Widely cultivated throughout Rajasthan. Kota: Hindoli Verma 1899.

A. graecizans L. ssp. *thellungianus* (Nevski) Gusev *A. polygamus* Hook. f. p.p.; FBI 4: 721; FUGP 3: 14.

Widespread in Rajasthan. Fls. & frts. Sept.-April. R. Chandrapura Verma 1824; Jhalawar Verma 6750.

A. tenuifolius Willd.; FBI 4: 722; FUGP 3: 14.

In south-east and south (Dungerpur Verma 108) Rajasthan, in moist places. Fls. & frts. April-May. Jhalawar Verma 3318.

AERVA Forssk. nom. conserv.

A. lanata (L.) Juss. ex Schult.; FBI 4: 728; FUGP 3: 16.

Widespread in Rajasthan. Fls. & frts. Sept.-Dec. Monoharthana Verma 3521; Kota Wadhwa 7526; 1945; Eklera Majum-

der 10040; Kishanganj *Wadhwa* 9385;
Dug, Naolekha *Verma* 6734.

ACHYRANTHES L.

A. aspera L.; FBI 4: 730; FUGP 3: 18.
Widespread in Rajasthan (Pratapgarh
Majumder 10167; Dungepur *Verma* 3459;
Kalakhet *Verma* 1742). Fls. & frts. Aug.-
April. Kota: Shahabad *Verma* 497; Jhala-
war *Wadhwa* 7485.

ALTERNANTHERA Forssk.

1. Bracts and sepals spinescent; sepals usually with hooked umbellate hairs at the base, indurated at maturity; leaves oblong, orbicular or ovate ...
2. Sepals 1-nerved, rarely obscurely 3-nerved at the base, base not indurated; bracts not shortly acuminate; anthers 3; hairs on perianth smooth ...
3. *A. pungens*
1. *A. sessilis*
- ... 2. *A. paronychoides*

A. sessilis (L.) DC. FBI 4: 731; FUGP 3: 20 (under the authorship R. Br.)

Widespread in Rajasthan. Fls. & frts. Sept.-May. Kota: Chambal dam *Verma* 1839; Shahabad *Verma* 631; Pirawa *Verma* 6856; Kota *Wadhwa* 9340; 1946; Jhalawar: Bijliya Bhadak *Wadhwa* 7473.

A. paronychoides St. Hill.; Dutta et Mitra in Ind. For. 87: 304, f. 2, 1961.

The south (Udaipur: Banki block *Verma* 35; Ramgarh lake *Wadhwa* 8406 A; 8411) and in south-east Rajasthan. Native of America. Fls. & frts. March-Dec. Kota: Barage *Wadhwa* 9479.

A. pungens HBK.; Melville in Kew Bull. 173, 1958. *A. repens* (L.) Link. (non Gmel.).

In the region east of the Aravalli. Native of America, now widespread in India. Fls. & frts. Sept.-Dec. Jhalawar: Eklera *Majumder* 10005.

GOMPHRENA L.

G. celosioides Mart.; Raizada in Ind. For. 76: 495, 1950.

Widespread in Rajasthan (Phulera-Sambhar Rd. *Wadhwa* 8260; Jaisamand *Verma* 101). Fls. & frts. almost throughout the year. Kota *Wadhwa* 1954; Bhilghati *Wadhwa* 9443; Jhalawar *Wadhwa* 5373.

BASELLACEAE

BASELLA L.

B. alba L. *B. rubra* L.; FBI 5: 20; FUGP 3: 27.

In south-east Rajasthan wild, but cultivated throughout the area. Fls. & frts. Oct.-Nov. Kota: Shahabad *Majumder* 13173.

CHENOPODIACEAE

CHENOPODIUM L.

C. album L.; FBI 5: 3; FUGP 3: 22.

Widespread in Rajasthan as a weed in waste places. Jhalawar: Sitabari forest *Wadhwa* 9289.

Another common plant in the adjoining area is *C. murale* L. It is a foetid tall herb, pale yellow and covered by almost transparent glistening glandular hairs. Leaves ovate-rhomboid to elliptic-oblong, dentate-serrate or lobulate. Flowers in terminal and axillary leafy panicles. Seeds with pitted testa.

POLYGONACEAE

Fruiting sepals 3+3, outer 3 smaller, inner 3 much larger and wider; stigma fimbriate ...

Fruiting sepals usually 5-lobed, lobes subequal; leafy herbs with ochreate stipules; stamens 8 or fewer; styles 2-3, capitate ...

1. *Rumex*

2. *Polygonum*

RUMEX L.

R. dentatus L.; FBI 5: 54; FUGP 3: 41.

In the region east of the Aravalli (Dungepur *Verma* 105; Jaipur *Wadhwa* 8205; Chittor *Majumder* 10396) including Mt. Abu. Fls. & frts. June-Dec. Kota: Kota Barage *Wadhwa* 9478.

POLYGONUM L.

1. Plants slender; flower-cluster axillary; ochrea more or less laciniate ...
More or less robust herbs; inflorescences terminal ...
2. Plants glabrous; ochrea e-ciliate; racemes panicle; plants on drying reddish ...
Ochrea ciliated, plants on drying not reddish, more or less hairy ...
3. Plants with glabrous stems but leaves hairy on the nerves beneath; ochrea sparsely hairy or not; peduncles glabrous ...
Plants densely hairy; peduncles hairy ...

1. *P. plebeium* 2
2. *P. glabrum* 3
3. *P. barbatum*
ssp. *gracile*
4. *P. stagninum*

P. plebeium R. Br.; FBI 5: 27; FUGP 3: 31.

Widespread in Rajasthan in moist situations. It is very difficult to separate different varieties due to intergrading series, hence varieties are not recognised. Fls. & frts. Aug.-May. Kota: Shahabad Verma 632; Jhalawar: Kalisind river Verma 3492 (var. *plebeium*); Shahabad Verma 632; Wadhwa 9202; Jhalawar Verma 3388; Kyasra Verma 6796; Bakani Kalisind Verma 7003; Chappi river Wadhwa 9531 (var. *griffithii* Hook. f.); Jhalawar Verma 1831 (var. *indicum* Hook. f.).

P. glabrum Willd.; FBI 5: 34; FUGP 3: 35.

Widespread in Rajasthan. Fls. & frts. Oct.-May. Jhalawar: Ameth Verma 3411; Kota: Kota Barrage Wadhwa 9477.

P. barbatum L. ssp. *gracile* Dans. *P. flaccidum* Roxb. *P. serrulatum* Hook. f.; FBI 5: 38, excl. var. *donii*; FUGP: 3: 37.

Throughout Rajasthan including Mt. Abu. Fls. Aug.-April. Jhalawar: Kalisind river Verma 3405; Kishanganj Verma 1716.

P. stagninum Buch.-Ham. ex Meissn.; FBI 5: 37; FUGP 2: 36.

In south (Chittor Verma 275) and in south-east Rajasthan. Fls. Aug.-April. Kalisind river bed Verma 3406; Kishanganj Verma 716.

ARISTOLOCHIACEAE

ARISTOLOCHIA L.

- | | | |
|-----------------------|--|--------------------------|
| 1. <i>P. plebeium</i> | Leaves 3.5-7 cm long and broad; flower solitary, axillary; fruit 1.8-2.5 cm long | 1. <i>A. bracteolata</i> |
| 2. <i>P. glabrum</i> | Leaves linear to obovate-oblong, much larger; flowers several together; capsules 3.5-5 cm long | 2. <i>A. indica</i> |

A. bracteolata Lamk. *A. bracteata* Retz.; FBI 5: 75; FUGP 3: 44.

Widespread in Rajasthan. Fls. & frts. July-Aug. Though as yet not collected from the area it may be found here also.

A. indica L.; FBI 5: 75; FUGP 3: 44.

In the region east of the Avavalli. Fls. & frts. Aug.-Sept. Jhalawar Wadhwa 7554.

LORANTHACEAE

DENDROPTHOE Mart.

D. falcata (L. f.) Etting. *Loranthus longiflorus* Desv.; FBI 5: 215; FUGP 3: 63.

In the south-east Rajasthan. Kota: Bundi-Chittor Rd. Majumder 10401.

SANTALACEAE

SANTALUM L.

S. album L.; FBI 5: 231; FUGP 3: 67.

In the south and south-east Rajasthan. Fls. & frts. Sept.-Dec. & March-May. Lotia Jhir Wadhwa 5377; Jhalawar: Chappi river Wadhwa 9534; Dug, Kyasra Verma 6783; Jhalawar Verma 3518.

EUPHORBIACEAE

- | | | |
|--|-----|---------------------|
| 1. Flowers in cup-shaped cyathia; juice milky | ... | 1. <i>Euphorbia</i> |
| Flowers not in cyathium | ... | 2 |
| 2. Ovary-cells each 2-ovuled; sap never milky | ... | Group-I |
| Ovary cells each 1-ovuled; sap often milky or coloured | ... | Group-II |

Group-I

- | | | |
|--|-----|---|
| 1. Sepals and petals present in the male flowers; stamens 5-6 | ... | 2 |
| Petals absent; sepals imbricate in bud; leaf-lets on short branches distichous and thus superficially resembling a compound leaf | ... | 3 |

2. Petals 5, scaly; filaments united into a column; fruit drupaceous; branches often thorny; leaves up to 22.5 cm long and 4-10 cm wide; shrub or small tree; flowers in spikes ...
3. Monoecious plants; disc absent or present ...
4. Calyx in male flowers connate; disc absent; female calyx 6-lobed; seeds ventrally invaginated; leaves elliptic, 1-3.8 cm long, turning dark brown on maturity; stamens 3, filaments connate and anthers adnate to the whole length of the column; fruit globose, succulent, dull red or purple ...
5. Branches drooping, leaf ovate or ovate-lanceolate 5-7 cm long coriaceous, serrate, dark green, pistillode none; drupe 1-celled, 1-seeded; trees ...

Group-II

1. Petals present at least in the male flowers; fruit capsular ...
2. Flowers in racemes yellow; leaves often slightly lobed, densely stellate-tomentose, never with stalked glands; capsule under 1 cm long ...
3. Leaves palmi-lobed, lobes serrate; filaments branched and fascicled; fruit densely spiny ...
4. Flowers racemose; females in the axils of cup-shaped bracts at the base of the inflorescence; males minute in the terminal part, that is often terminated by a sterile appendage ...
5. Leaves and ovaries covered by scarlet glands; stamens many; stigmas-3 ...

2. *Bridelia*
3. *Andrachne*

4

5

4. *Melanthesa*

5. *Phyllanthus*

7. *Drypetes*

6. *Securinega*

8. *Chrozophora*

9. *Jatropha*

10. *Ricinus*

11. *Acalypha*

12. *Mallotus*

EUPHORBIACEAE

EUPHORBIA L.

6. Erect, coarse, shrubby plants; leaves rather harsh; fruiting perianth stellately spreading; flowers very minute ...
- A perennial trailing or twining herb with stinging hairs; female sepals large, pinnatifid, hispid, much enlarging in fruit ...

13. *Baliospermum*14. *Tragia*

1. Stems succulent, spiny, terete or angular; branches whorled ...
2. Spine-pairs deep brown or black, on the whitish corky base (aeriole) above flattish elongated swellings of the branchlets that more or less confluent in five vertical or spiral lines so that young branch is more or less obtusely pentagonal in cross-section ..
3. Leaves alternate or alternate below and opposite above ...
4. Leaves oblong-ovate, often sub-rhomboid over 5 cm long; erect herb with hollow stems ...

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E. ligularia Roxb. ; FUGP 3: 76; *E. neriifolia* Hook. f. ; FBI 5: 255.

In the region east of the Aravalli (Chittor

Verma 32; Jaipur *Wadhwa* 8146). Fls. & frts. during the hot weather. Jhalawar: Manoharthana *Verma* 3478.

E. nivulia Buch.-Ham.; FBI 4: 255. *E. neriifolia* sensu Duthie in FUGP 3: 76.

Widespread in Rajasthan. Fls. in hot season. Kota: Shahabad *Verma* 628.

E. prunifolia Jacq. *E. geniculata* Ort.; Santapau in Bull. bot. Soc. Beng. 8: 5, 1954.

In south (Chittor *Majumder* 10203; Banki *Verma* 22; Dani talao *Verma* 1770) and south-east Rajasthan. Chandrapura *Verma* 1817; Kota: Shahabad *Majumder* 13277. Fls. & frts. Sept.-April. Native of Trop. America.

E. dracunculoides Lamk.; FBI 5: 262; FUGP 3: 78.

Throughout Rajasthan. Fls. & frts. Sept.-April. Jhalawar: Khanpura *Wadhwa* 9589; Eklara *Majumder* 10149; Kota: Baran *Wadhwa* 9405; *Majumder* 10427.

E. elegans Spr.; FBI 5: 246; FUGP 3: 79.

Rare in the region east of the Aravalli (Bansi *Majumder* 123310). Fls. & frts.: Oct.-Jan. Kota *Verma* 1734.

E. hypericifolia L.; FBI 5: 249 p.p.; FUGP 3: 80. *E. parviflora* L.

Throughout Rajasthan. Fls. & frts. Aug.-April. Jhalawar: Piplosa *Verma* 6962; Kalisind river *Verma* 1862; 1864; 3386; Manoharthana *Verma* 3476; Shahabad *Verma* 458; 630. Kota *Wadhwa* 1970; Bundi *Verma* 1862.

E. hirta L. FUGP 3: 80; *E. pilulifera* Hook. f.; FBI 5: 250.

Widespread. Fls. & frts. Aug.-Feb. Jhalawar *Verma* 3316; Khanpur-piplosa *Verma* 6937; Kishanganj *Wadhwa* 9392; Shahabad *Wadhwa* 9225.

E. thymifolia L.; FBI 5: 252; FUGP 3: 81.

In the south-east Rajasthan. Fls. Aug.-Sept. Kapildhara; Puraniya *Verma* 779.

E. prostrata Ait.; FBI 5: 266.

Throughout Rajasthan (Chittor *Verma*

1604; Phalsund *Wadhwa* 4759 A). Native of Trop. America. Jhalawar *Verma* 3363.

E. orbiculata HBK. *E. microphylla* Heyne ex Roth; FBI 5: 252; FUGP 3: 82.

Throughout Rajasthan. Fls. Aug.-April. Kota: Shahabad *Wadhwa* 9339.

BRIDELIA Willd.

B. retusa (L.) Spr.; Santapau in Journ. Bomb. Nat. Hist. Soc. 50: 308. 1953.

In the region east of the Aravalli. Fls. & frts. Aug.-Dec. Shahabad, Kund-Koh *Verma* 805; 638; Jhalawar *Majumder* 10057; Dug *Verma* 6779; 7479.

ANDRACHNE L.

A. telephioides L.; FBI 5: 284.

In south-east Rajasthan. Fls. Nov.-Dec. Jhalawar: Bakani in Kalisind river bed *Verma* 7024.

MELANTHESA Bl.

M. rhamnoides (Retz.) Bl. *Breynia rhamnoides* (Retz.) Muell.-Arg.; FBI 5: 330; FUGP 3: 93.

Throughout Rajasthan. Fls. & frts Nov.-Dec. Jhalawar: Bakani, Modiya Khal *Verma* 7048A.

PHYLLANTHUS L.

- | | |
|---|------------------------------|
| 1. Stamens 5, in two series, the three inner filaments connate; fruit a globose berry, about 4 mm across; a scandent shrub | 1. <i>P. reticulatus</i> |
| Stamens three, filaments united, rarely free | 2 |
| 2. Herbs; fruits capsular | 3 |
| Trees; fruit berry-like, acidic; styles three, each twice bifid | 5. <i>P. emblica</i> |
| 3. Anthers erect, slit vertical; leaves rather distant, cuneate-obovate; capsules smooth; calyx in fruit stellately spreading | 2. <i>P. maderaspatensis</i> |
| Anthers didymous, reniform, the cells sub-globose, slit very short; fruit a capsule; styles once bifid, free or connate | 4 |
| 4. Seeds finely tubercled; stipules peltate; a perennial herb or under-shrub | 3. <i>P. virgatus</i> |
| Seeds with parallel ribs on the back; stipules lanceolate-subulate; leaves coriaceous to herbaceous | 4. <i>P. debilis</i> |

P. reticulatus Poir.; FBI 5: 288; FUGP 3: 95; Webst. in Journ. Arn. Arb. 38: 57. 1957.

Widespread. Fls. & frts. April-May and Dec.-Jan. Jhalawar: Bijliya Bhada *Wadhwa* 5371; Kota *Wadhwa et Prosad* 9360; Sohagpura *Wadhwa* 9374; Jhalawar-Khanpura Rd. *Wadhwa* 9543.

P. maderaspatensis L.; FBI 5: 292; FUGP 3: 97.

Widespread in Rajasthan. Jhalawar: Hathikhedi Block *Wadhwa* 7676; Kota: Shahabad *Majumder* 13155.

P. virgatus Forst. f. *P. simplex* Retz.; FBI 5: 295; FUGP 3: 97.

In the region east of the Aravalli including Mt. Abu. Fls. & frts. Aug.-Dec. Jhalawar: Pirawa *Verma* 6869; Kota: Shahabad *Verma* 420; 467; Chandrapura *Verma* 1815; Bijliya Bhada *Wadhwa* 7417.

P. debilis Klein. ex Willd.; FBI 5: 299.

P. niruri p.p. Hook. f. in FBI 5: 298; FUGP 3: 98.

Widespread in Rajasthan (Shergarh *Wadhwa* 4711; Phalsund *Wadhwa* 4773; Udaipur *Majumder* 11694). Fls. & frts. July-Aug. Kota: Shahabad *Majumder* 13206.

P. emblica L.; FBI 5: 289; FUGP 3: 96.

In the forest in the region east of the Aravalli; very common in Ghatoli forset, Cittorgarh.

Local name: Ambla, aonhla.

P. amarus Schum. et Thonn. (*P. niruri*) may be found.

SECURINEGA Juss. nom. conserv.

Unarmed; leaves 2.5-7.5 cm long and 2.5-3 cm broad, elliptic or obovate, rounded at the apex; main nerves 5-7-pairs; fruit usually dry and very small, but some of them larger and with a fleshy pericarp ...

Branchlets ending in thorns; leaves 5 mm-2.5 cm long, rarely more, obovate or orbicular, sometimes emarginate, glaucous, reticulate; fruit dry globose, white, 6 mm across ...

1. *S. virosa*

2. *S. leucopyrus*

S. virosa (Willd.) Pax et Hoffm. *Flueggea microcarpa* Bl.; FBI 5: 328; FUGP 3: 91.

In the region east of the Aravalli. Fls. April-May, frts. Aug.-Sept. Kota: Shahabad *Wadhwa et Prosad* 9324; Jhalawar *Verma* 7519.

S. leucopyrus (Willd.) Muell.-Arg. *Flueggea leucopyrus* Willd. FBI 5: 328; FUGP 3: 92.

In south (Udaipur *Majumder* 12496; Mohangarh *Wadhwa* 5137), north-west and in south-east Rajasthan. Fls. May-Aug., frts. Sept.-Oct. Jhalawar: Kokanda-Denwas *Wadhwa* 5419.

DRYPETES Vahl

D. roxburghii (Wall.) Hurus *Putranjiva roxburghii* Wall.; FBI 5: 336; FUGP 3: 99.

Planted as avenue tree. Fls. April-May; frts. ripen in Dec.-Jan. Eklera *Majumder* 10004.

CHROZOPHORA Neck.

Stem prostrate, stellately woolly, diffusely branched from root; capsule not tinctorial; sepals of female flowers linear; leaves not glandular at base, ovate or suborbicular, 1.5-3.0 cm across, strongly wrinkled and bullate; anthers under 2.5 mm long ...

1. *C. prostrata*

Stem erect, much branched above the root, stellately tomentose; sepals of female flowers linear; capsules 8.0 mm across, reddish, tinctorial when wetted; leaves ovate-orbicular, tri-lobed, undulate crenate with sessile stellate hairs; anthers over 2.5 mm long ...

2. *C. rottleri*

C. prostrata Dalz.; FUGP 3: 106.

In south-east Rajasthan. Fls. & frts. Dec.-May. Jhalawar: Dug-Naolekha *Verma* 6732; Kota *Wadhwa* 9205.

C. rottleri (Geis.) Juss. ex Spreng FUGP 3: 105. *C. plicata* -1 Hook. f.; FBI 5: 409.

Throughout Rajasthan. Fls. & frts. Dec.-May. Eklera *Majumder* 10037; Jhalawar: Bakani *Verma* 7020; Kalisind river *Verma* 3394; Khanpura *Wadhwa* 9545.

JATROPHA L.

Petals red or purple; leaves lobed, copper coloured, lobes with stalked yellow viscid glandular hairs; petioles also with branched glandular hairs ...

1. *J. gossypifolia*

Petals yellow; leaves entire or 3-5-lobed or angled, but without glandular hairs, green ...

2. *J. curcas*

J. gossypifolia L. ; FBI 5: 383.

Native of Brazil. Fls. & frts. July-Dec. Jhalawar: Jhalarpatan *Verma* 3351.

J. curcas L. ; FBI 5: 383; FUGP 3: 116.

American. In the region east of the Aravalli including Mt. Abu, often planted as hedge plants. (Jaipur *Wadhwa* 8356; Chittor *Majumder* 12448). Fls. & frts. April-Dec. Kota: Nahargarh forest *Wadhwa* 9393; Jhalawar: Manoharthana *Verma* 3477; Parshad *Verma* 126.

RICINUS L.

R. communis L. ; FBI 5: 457; FUGP 3: 113.

Native of Africa and India; cultivated and as an escape. Fls. & frts. Sept.-Feb. Pirawa *Verma* 6843.

ACALYPHA L.

- | | | |
|---|-----|-------------------------|
| 1. Bracts concealing the capsules, eglandular | ... | 2 |
| Bracts shorter than the capsules exposing them, glandular | ... | 3 |
| 2. Bracts shortly dentate, truncate | ... | 1. <i>A. indica</i> |
| Bracts fimbriate | ... | 2. <i>A. ciliata</i> |
| 3. Capsules glabrous; bracts 2-5-flowered | ... | 3. <i>A. malabarica</i> |
| Capsules hispid; bracts 1-flowered | ... | 4. <i>A. lanceolata</i> |

A. indica L. ; FBI 5: 416; FUGP 3: 108.

Widespread in Rajasthan. Fls. & frts. Sept.-June. Kota: Bundi *Verma* 1848; Kota *Wadhwa* 1950.

A. ciliata Forssk. ; FBI 5: 423; FUGP 3: 109.

Widespread in Rajasthan. Fls. & frts. Oct.-June. Jhalawar: Bijliya Bhadak *Verma* 7423; *Wadhwa* 5364; Misroli *Verma* 7662; 7664.

A. malabarica Muell.-Arg. ; FBI 5: 416.

In south (Bansi *Majumder* 12354) and in south-east Rajasthan. Fls. & frts. Sept.-Nov. Kota: Shahabad *Verma* 474; Kapildhara-Puraniya *Verma* 183.

A. lanceolata Willd. *A. fallax* Muell.-Arg. ; FBI 5: 416.

In south-east Rajasthan. Fls. & frts. Sept.-Oct. Jhalawar *Verma* 7464.

MALLOTUS Lour.

M. philippensis (Lam.) Muell.-Arg. ; FBI 5: 442; FUGP 3: 110.

In the region east of the Aravalli including Mt. Abu. Fls. Nov.-Jan. Frts. ripen in March-May. Jhalawar: Asnawar *Verma* 6899; Bager *Verma* 6978; Kota: Kunda-Koh *Verma* 793; Shahabad *Wadhwa* et *Prosad* 9335.

BALIOSPERMUM Bl.

B. montanum (Willd.) Muell.-Arg. *B. axillare* Bl. ; FBI 5: 461; FUGP 3: 107.

In south-east Rajasthan. Fls. & frts. almost throughout the year. Sitabari forest *Wadhwa* 9319; *Eklara Majumder* 10029.

TRAGIA L.

T. involucrata L. ; FBI 5: 465; FUGP 3: 114.

In south-east Rajasthan. Fls. Nov.-Dec. Jhalawar: Piplosa *Verma* 6960.

MORACEAE

- | | | |
|---|-----|-----------------|
| Flowers in closed receptacle or hypanthodium | ... | 1. <i>Ficus</i> |
| Flowers open; leaves thin often lobed; stamens inflexed in bud; anthers reversed; ovule pendulous; female sepals fleshy in fruit and enclosing it, hardly 2 cm long | ... | 2. <i>Morus</i> |

FICUS L.

- | | | |
|---|-----|------------------------|
| 1. Leaves alternate | ... | 2 |
| Leaves usually opposite, ovate-oblong or subobovate, hispid; receptacle 1.2-2.5 cm across, in pairs or from old wood or both, yellowish when ripe; peduncles 5-12 mm long | ... | 7. <i>F. hispida</i> |
| 2. Receptacle sessile, rarely shortly pedunculate (<i>F. virens</i>) | ... | 3 |
| Receptacle distinctly peduncled | ... | 6 |
| 3. Leaves not caudate | ... | 4 |
| Leaves caudate, apical tail half or more the length of the blade; receptacle sessile, dark-purplish on maturity, with three, broad spreading basal bracts; leafbase not cordate nor receptacles from the axils of fallen leaves | ... | 1. <i>F. religiosa</i> |
| 4. Receptacle red or yellowish 7.5-1.8 cm across | ... | 5 |
| Receptacle globose, in axillary pairs, not on tubercles, 6 mm across, white, flushed with red and dotted when ripe; leaves ovate-oblong to ovate, apex rather abruptly acuminate; petioles 2.5 cm long or longer | ... | 4. <i>F. virens</i> |

5. Leaves obtuse, elliptic to broadly ovate; receptacles in axillary pairs, globose puberulous, about 1.8 cm across, with three large rounded basal bracts, red and downy when ripe ... 2. *F. benghalensis*
 Leaves elliptic ovate to obovate-rotund; petioles rarely over 1.2 cm long; receptacles in axillary pairs, depressed globose; glabrous about 7.5 mm across, yellowish or reddish when ripe ... 3. *F. microcarpa*
6. Receptacle solitary, axillary, 1.2-2.5 cm across, subglobose or pyriform, pubescent, yellow on maturity; leaves orbicular-ovate, dentate, serrate, entire or lobed, softly pubescent ... 5. *F. palmata*
 Receptacles supported by scarious bracteoles arranged along tubercled and warty branchlets, subglobose smooth, about 3 cm across, reddish when ripe; peduncles up to 1.8 cm long; leaves entire, elliptic-lanceolate, ovate or obovate-oblong, glabrous ... 6. *F. racemosa*

F. religiosa L.; FBI 5: 513; FUGP 3: 150.

Throughout Rajasthan. New leaves appearing from Feb.-March; receptacles ripen during April-May. Shahabad: Kishanganj *Verma* 676; Jhalawar: Dug *Verma* 3534.

F. benghalensis L.; FBI 5: 499; FUGP 3: 147. *F. indica* L.

Throughout Rajasthan, often planted. New leaves appearing from March-May and receptacles ripen during April-June. Kota: Baran: *Wadhwa* 9404; Manoharthana *Verma* 3454.

Local name: Bar, barga.

F. microcarpa L. f.; Corner in Gard. Bull. Singapur 17: 397. 1954. *F. retusa* Hook. f.; FBI 5: 511; FUGP 3: 149.

In the region east of the Aravalli, including Mt. Abu. Kota: Kunda-Koh *Wadhwa* 9237.

Local name: Nandan.

F. virens Ait. *F. infectoria* Roxb.; FBI 5: 515; FUGP 3: 153.

Throughout Rajasthan including Mt. Abu. Frts. ripen May-June. Kunda-Koh *Wadhwa* 9234; Kapildhara-Purniya *Verma* 757.

Local name: Pakhar, pilkhan.

F. palmata Forssk.; FBI 5: 530; FUGP 3: 158.

Widespread in the region east of the Aravalli including Mt. Abu. New foliage—March-April; frts. Jan.-Oct. Jhalawar: *Eklara Wadhwa* 7617; Banki block *Verma* 6; Manoharthana *Verma* 3447.

F. racemosa L.; Corner in Dansk Bot. Arkiv. 23: 28, 1963. *F. glomerata* Roxb.; FBI 5: 535; FUGP 3: 160.

Throughout Rajasthan. Leafless in Aug. Sept. Frts. ripen April-July. Duthie Jhalapatan *Wadhwa* 9497; *Eklara Verma* 7508; Jhalawar *Verma* 3343.

F. hispida L. f.; FBI 5: 522; FUGP 3: 155.

In south (Dungerpur *Verma* 154; Banswara *Majumder* 10245) and in south-east Rajasthan. New leaves in Feb.-March. Frts. ripen in May-June. Jhalawar: Ameth *Verma* 3412; Khanpura *Wadhwa* 6934; *Eklara*: Newaj. *Wadhwa* 762; Jhalawar: Asnawar *Verma* 6897.

ULMACEAE

Fruit dry, samaroid; trees with penninerved, deciduous leaves; leaves not scabrous ...

1. *Holoptelea*

Fruit a drupe; a small tree with scabrous leaves; leaves 3-7-nerved from base ...

2. *Trema*

HOLOPTELEA Planch.

H. integrifolia Planch.; FBI 5: 481; FUGP 3: 120.

In the region east of the Aravalli including Mt. Abu. Fls. & frts. Feb.-May. Jhalawar: Manoharthana *Verma* 3460; Kota: Nasirabad *Wadhwa* 9502.

TREMA Lour.

Leaves distinctly unequal at the base, usually 3-nerved, softly pubescent beneath ...

1. *T. orientalis*

Leaves almost equal at the base, usually 5-nerved, scabrid on both the surfaces ...

2. *T. politoria*

T. orientalis (L.) Bl.; FBI 5: 484; FUGP 3: 122.

In south and south-east Rajasthan. Fls. & frts. Aug.-Sept. Kota: Shahabad *Verma* 602; Kunda-Koh *Verma* 795.

T. politoria Planch.; FBI 5: 484; FUGP 3: 123.

In the region east of the Aravalli including Mt. Abu. Fls. April-June. Kota: Parbati river bank *Wadhwa et Prosad* 9376.

CERATOPHYLLACEAE

CERATOPHYLLUM L.

C. demersum L.; FBI 5: 639; FUGP 3: 168.

Widespread in Rajasthan in lakes, ponds and canals.

MONOCOTYLEDONS

HYDROCHARITACEAE

1. Stem branching, leafy; leaves small, spathes small, sessile ...
Stems none or with stolons only or a creeping root-stock ...
2. Leaves at least upper whorled; style undivided; leaves 4-8 in a whorl, 6-9 mm long ...
Leaves alternate and opposite, 7.5-10 mm long; style notched ...
3. Leaves very long, sessile; male scapes several flowered; perianth single; female pedicel very long, coiled ...
Leaves at least some petioled; fruit winged, submerged; flowers solitary ...

1. *Hydrilla*2. *Lagerosiphon*3. *Vallisneria*4. *Ottelia*

HYDRILLA Rich.

H. verticillata Royle; FBI 5: 659; FUGP 3: 173.

Widespread in Rajasthan (Banswara *Verma* 225; Dungerpur *Verma* 137). Fls. & frts. Dec.-April. Jhalawar: *Eklara Majumder et Misra* 10047.

LAGEROSIPHON Harv.

L. alternifolia (Roxb.) Druce *L. roxburghii* Benth.; FBI 5: 659; FUGP 3: 174.

In the region east of the Aravalli Kota *Gupta*.

VALLISNERIA L.

V. spiralis L.; FBI 5: 660; FUGP 3: 174.

Widespread in Rajasthan. Fls. & frts. Dec.-April. Kota: Baran *Wadhwa* 9403; Sambhar village *Wadhwa* 8274; 8275; Pirawa *Verma* 6850.

OTTELIA Pers.

O. alismoides Pers.; FBI 5: 662; FUGP 3: 177.

In the south and south-east Rajasthan (Kota *Gupta*; Udaipur *Ramdeo*); common in tanks and jheels. Fls. & frts. Dec.-April. Jhalawar: Chikli *Verma* 3313; Ujjad stream *Wadhwa* 9546; Bakani, Modiya Khal *Verma* 7040.

ORCHIDACEAE

ZEUXINE Lindl.

Z. strateumatica (L.) Schlecht. *Z. sulcata* Lindl.; FBI 6: 106; FUGP 3: 219.

- 2 Common within the area in open turfy
- 3 and usually moist ground. Fls. Jan.-Feb. Observed to grow in the moist grassy places at Shahabad region.

ZINGIBERACEAE

CURCUMA L.

C. amada Roxb.; FBI 6: 214.

In the south-east Rajasthan. Fls. August. Kota: Kishanganj *Verma* 687; Kapildhara, Puraniya *Verma* 791; 7901.

HYPOXIDACEAE

CURCULIGO Gaertn.

C. orchiioides Gaertn.; FBI 6: 279; FUGP 3: 247.

In the region east of the Aravalli including Mt. Abu. Fls. Aug.-Sept. Kota: Shahabad *Verma* 624.

DIOSCOREACEAE

DIOSCOREA L.

Leaves alternate, ovate-cordate; male spikes longer; tubers sometimes slightly elongating; male flowers in pendulous spikes, perianth-lobed with the stamens inserted at their bases, filaments free; seeds winged at one side; capsules elongated, reflexed ...
Leaves tri-foliolate, long petioled; leaflets broadly cuneate-obovate, cuspidately caudate acuminate; male racemes pubescent or woolly; female spikes solitary; stamens 6, fertile; capsule rounded; seeds with oblong wing broader than the nucleus ...

1. *D. bulbifera*2. *D. hispida*

D. bulbifera L.; Burk. in Fl. Malesiana ser. 1, 4: 310, 1951.

In the region east of the Aravalli. Fls. & frts. Sept.-Oct. Kota: Kishanganj, Kaniya de Verma 734; Eklera Wadhwa 75421. Jhalawar Wadhwa 3583.

D. hispida Dennst. var. **daemona** Prain et Burk. *D. daemona* Roxb. FBI 6: 289.

In the south and south-east Rajasthan. Fls. & frts. April-May. Jhalawar: Baneth Verma 64; Shahabad, Kishanganj Verma 673; Katra Kajalia Wadhwa 3534.

AMARYLLIDACEAE

CRINUM L.

C. defixum Ker.-Gawl.; FBI 6: 280; FUGP 3: 248.

In the south and south-east Rajasthan. common on the river banks. Fls. Sept.-Jan. Jhalawar: Bakani Kalisind Verma 7027; Eklera, Newaj river bank Wadhwa 7604; Sarhod Wadhwa 7687; Kishanganj Verma 682.

LILIACEAE

1. Stems above ground, climbing or straggling; leaves scaly ...
Herbs with annual stems or scapes rising from the underground root-stock, corm or bulb; rarely plants annual, erect ...
2. Herbs with annual stems, climbing, leafy; leaves broad with tendriller apices; perianth large showy; root-stock tuber-like, naked ...
3. Plants bulbiferous; annual, scales simple, naked; leaves radical; flowers racemose ...
Plants without bulb; root fibrous, large, some or all fleshy tuberous; leaves radical, half-terete or terete and fistular; ovules two in each cell; capsule triquetrous ...
4. Perianth 6-lobed, tube cylindric, outer lobes spreading; inner erect; bulb ovoid, small ...
Perianth campanulate, 6-partite; bulbs large ...

ASPARAGUS L.

A. racemosus Willd.; FBI 6: 316; FUGP 3: 259.

Widespread in Rajasthan. Fls. Aug.-Sept.

Frts. ripen Nov.-Dec. Jhalawar: Verma 6756; Bundi, Mangli river Verma 1854; Shahabad Verma 639; Majumder 10460.

GLORIOSA L.

G. superba L.; FBI 6: 358; FUGP 3: 262.

In the region east of the Aravalli. Fls. & frts. Aug.-Nov. Kokanda Denwas Wadhwa 5433; Shahabad, Kishanganj Verma 770.

DIPCADI Medic.

D. serotinum Medic.; FBI 6: 346.

In south (Banswara Wadhwa 5028) and south-east Rajasthan. Fls. & frts. Aug.-Sept. Jhalawar. Wadhwa 5317 A.

URGINEA Steinh.

U. indica (Roxb.) Kunth; FBI 6: 347; FUGP 3: 264.

In the south Rajasthan. Fls. & frts. Sept.-Oct. Parshad range Verma 129.

ASPHODELUS L.

A. tenuifolius Cav.; FBI 6: 332; FUGP 3: 265.

Widespread in Rajasthan; a weed in the cultivated fields. Fls. & frts. Dec.-April. Jhalawar Bhowanimandi Verma 3496; Mahewa Wadhwa 8146.

PONTEDERIACEAE

MONOCHORIA Presl

Leaves hastate, sagittate or cordate; flowers on long stalks sub-umbellate or racemose ...

1. *M. hastata*

Leaves ovate or ovate-cordate; flowers many on short stalks, sub-spicate ...

2. *M. vaginalis*

M. hastata (L.) Solms. *M. hastaeifolia* Presl; FBI 6: 362; FUGP 3: 369.

In the south-east Rajasthan. Fls. & frts. Sept.-Oct. Shahabad, Kishanganj Verma 689; Kota Wadhwa 9352; Baran Majumder 10435.

M. vaginalis Presl; FBI 6: 363; FUGP 3: 270.

In south and south-east Rajasthan. Fls. & frts. Sept.-Oct. Kota *Wadhwa* 1957. The other plant, *Eichhornia crassipes* (Mart.) Solms. an obnoxious weed in the adjoining areas is also showing up in the region. It is a floating plant with swollen petioles and beautiful bluish flowers.

COMMELINACEAE

- | | | |
|--|-----|---------------------------|
| 1. Stamens 2-3-perfect with 1-3-staminal nodes | ... | 2 |
| Stamens 6 perfect | ... | 3 |
| 2. Cymes enclosed in spathaceous bracts | ... | 1. <i>Commelina</i> |
| Cymes panicked; bracts not spathaceous | ... | 2. <i>Murdannia</i> |
| 3. Flowers within leaf-sheath; fleshy, aquatic herbs | ... | 3. <i>Amischophacelus</i> |
| Flowers within the imbricating bracteoles; terrestrial herbs | ... | 4. <i>Cyanotis</i> |

COMMELINA L.

- | | | |
|---|-----|---------------------------|
| 1. Capsule 5-seeded; 2-cells-2-seeded and one 1-seeded | ... | 2 |
| Capsules usually 3-seeded | ... | 5 |
| 2. Spathes complicate; leaves lanceolate | ... | 3 |
| Spathes funnel-shaped, leaves ovate or oblong | ... | 4. <i>C. benghalensis</i> |
| 3. Spathes 2.5 cm long or less; rounded or cordate at the base | ... | 4 |
| Spathes 2.5-5 cm long, axillary, solitary; flowers dark blue; seeds black powdered with white | ... | 3. <i>C. longifolia</i> |
| 4. Seeds cylindric, reticulate, black; spathes sometimes 3 cm long | ... | 1. <i>C. diffusa</i> |
| Seeds smooth, not appendaged, cylindric-conic | ... | 2. <i>C. hasskarlaei</i> |
| 5. Spathes 1.8-3.8 cm long and broad, subsessile, funnel-shaped; flower heads not subtended by smaller leaves | ... | 5. <i>C. paludosa</i> |
| Spathes sessile, usually capitate, 1.8 cm long and broad, accompanied by small leaves except the normal terminal leaves | ... | 6. <i>C. undulata</i> |

C. diffusa Burm. f. *C. nudiflora* C. B. Clarke; FBI 6: 369; FUGP 3: 272.

In the south-east Rajasthan. Fls. & frts. Sept.-May. Kota *Wadhwa* 1969; *Wadhwa et Prosad* 9464; Hindoli *Verma* 1880.

C. hasskarlaei C. B. Clarke in FBI 6: 370; FUGP 3: 273.

In south-east Rajasthan. Fls. & frts. Sept.-Jan. Jhalawar: Hathi khedi *Wadhwa* 7681; Baran *Majumder* 10453; Kota *Majumder* 10840.

C. longifolia Lamk. *C. salicifolia* Roxb.; FBI 6: 370; FUGP 3: 273.

Merwara *Duthie*; may be available in the south-east Rajasthan also.

C. benghalensis L.; FBI 6: 270; FUGP 3: 274.

Widespread in Rajasthan. Fls. & frts. Aug.-April. Kota: Shahabad *Verma* 635; Puraniya *Verma* 764; Jhalawar *Wadhwa* 7439; 5367; Arniya river *Wadhwa* 7623; 7469.

C. paludosa Bl. *C. obliqua* Buch.-Ham. ex Don; FBI 6: 372; FUGP 3: 275.

In the region east of the Aravalli. Fls. & frts. Aug.-Sept. Jhalawar *Wadhwa* 7431; Kota: Shahabad *Verma* 641; Puraniya *Verma* 763; 762.

C. undulata R. Br. *C. kurzii* C. B. Clarke in FBI 6: 373; *C. obliqua* var. *mathewii* C. B. Clarke

In the region east of the Aravalli. Fls. & frts. Oct.-Jan. Kapildhara, Puraniya *Verma* 480; Shahabad *Majumder* 13116; Naka Kota *Verma* 480.

MURDANNIA Royle

M. nudiflora (L.) Brén. *Aneilema nudiflorum* R. Br.; FBI 6: 378; FUGP 3: 277.

Widespread in Rajasthan. Fls. & frts. Sept.-Oct. Jhalawar: Sarhod *Wadhwa* 3569; Kishanganj *Verma* 745; 755; Jhalawar *Wadhwa et Verma* 7411; Baran *Majumder* 10849; Kota *Majumder* 13133.

AMISCHOPHACELUS Rao et Kamathy

A. axillaris (L.) Rao et Kamathy; *Cyanotis axillaris* (L.) J. A. & J. H. Schult.; FBI 6: 388; FUGP 3: 280.

Widespread in Rajasthan in moist places. Fls. & frts. Sept.-Jan. Jhalawar: Kokanda Denwas block *Wadhwa* 5426; Kishanganj *Verma* 724; Bijliya Bhada *Wadhwa* 7408.

A. cucullata (Roth) Rao et Kamathy (*C. cucullata* Kunth) has also been reported from south Rajasthan. (Banswara: Bhangra *Kanodia* 75458). It differs from *A.*

axillaris having smooth filaments and 3-horned capsules.

CYANOTIS Don

Leaves ovate-oblong, glabrous or with spreading hairs, base rounded or cordate, 4-10 cm long and 2-20 mm broad; bracteoles 1.2 cm long, ovate, falcate, acute ...

Leaves linear or narrowly lanceolate, 3-7 cm long and 4-5 mm broad, cottony hairy; bracteoles under 1 cm long, cottony hairy ...

1. *C. cristata*

2. *C. arachnoidea*

C. cristata Schult. f.; FBI 6: 385; FUGP 3: 279.

In the region east of the Aravalli including Mt. Abu. Fls. & frts. Sept.-Oct. Jhalawar: Sarhod *Wadhwa* 3575.

C. arachnoidea C. B. Clarke var. *thwaitesii* (Hassk.) Rao et Kamathy; *C. fasciculata* R. et S.; FBI 6: 388.

In the region east of the Aravalli including Mt. Abu. Fls. & frts. Sept.-Oct. It seems to be conspecific with *C. lanata* Benth. as pointed out by Morton, J. K. [*Journ. Linn. Soc. London* 60, (381): 194, 1967]. Some authentic sheets of *C. lanata* seen at Komorov Botanical Institute, Leningrad, U.S.S.R. seems to favour the view.

PALMAE

PHOENIX L.

P. sylvestris (L.) Roxb.; FBI 6: 425; FUGP 3: 286.

The tree fls. in Dec. and Jan., and the fruit ripen during April-June—*Duthie*. It is common throughout Rajasthan. Another species reported from south Rajasthan is *P. acaulis* Buch.-Ham. ex Roxb.

PANDANACEAE

PANDANUS L.

P. fascicularis Lamk.; FBI 6: 485; FUGP 3: 291.

Widespread in Rajasthan. Fls. during rains.

TYPHACEAE

TYPHA L.

T. domingensis Pers. *T. angustata*; FBI 6: 489; FUGP 3: 293.

Common throughout Rajasthan, in the marshy places or on the margins of the slow running streams. Fls. & frts. Dec.-April. Kota: Sitabari forest *Wadhwa* 9316; Jhalawar *Verma* 3340.

ARACEAE

Floating stemless aquatic herbs; leaves sessile obovate-cuneate in a rosette-like tuft; base stoloniferous ...

1. *Pistia*

Terrestrial herbs; leaves and scapes rising from an underground corm; leaves more or less lobed; flowers preceeding the solitary leaf; male and female flowers remote, male flowers almost sessile; leaves pedately-partite; spadix with a terminal appendage, edges of spathes connate below ...

2. *Sauromatum*

PISTIA L.

P. stratiotes L.; FBI 6: 497; FUGP 3: 297.

In the region east of the Aravalli. Fls. during hot season. Jhalawar *Wadhwa* 7535.

SAUROMATUM Schott.

S. guttatum Schott.; FBI 6: 508; FUGP 3: 299.

In south-east Rajasthan. Fls. in hot weather, very foetid—*Duthie*.

LEMNACEAE

Fronds more or less flat, with one or several roots, green or purple beneath ...

1. *Lemna*

Fronds rootless, minute, subglobose beneath ...

2. *Wolffia*

LEMNA L.

1. Fronds usually broadly obovate or orbicular; purplish beneath; roots several ...

1. *L. polyrrhiza*

Fronds green on both the surfaces, roots solitary ...

2

2. Fronds entire; branches soon detached ...

2. *L. perpusilla*

Fronds serrulate at the tip, branches hastate, persistent ...

3. *L. trisulca*

L. polyrrhiza L.; FBI 6: 557; *Spirodelea polyrrhiza* Schleid.; FUGP 3: 305.

Widespread; floating in still water. Ek-
lera *Wadhwa* 7534.

L. perpusilla Torr. *L. paucicostata* Hegelm.;
FBI 6: 556; FUGP 3: 305.

Common on ponds and in shallow slug-
gish streams. Fls. Oct. *Merwara-Duthie*.
L. trisulca L.; FBI 6: 557; FUGP 3: 306.

In south Rajasthan, may be found in the
south-eastern part also.

WOLFFIA Horkel

W. arrhiza Wimm.; FBI 6: 557; FUGP 3:
306.

Common in the area.

BUTOMACEAE

TENAGOCHARIS Hochst.

T. latifolia (D. Don) Buchen. *Butomopsis*
lanceolata (Roxb.) Kunth; FBI 6: 562;
FUGP 3: 311.

In the south-east Rajasthan. Fls. & frts.
Aug.-Oct. Kota: Shahabad *Wadhwa* 13197.

ALISMATACEAE

SAGITTARIA L.

S. guayanensis HBK. ssp. *lappula* (D. Don)
Bogin; *S. guayanensis* HBK.; FBI 6:
561; FUGP 3: 310.

In the south-east Rajasthan. Fls. & frts.
Sept.-Oct. Kota *Wadhwa et Verma* 1958;
Shahabad *Majumder* 10855; 13160. In *S.*
sagittifolia leaves are sagittate.

ZANNICHELLIACEAE

ZANNICHELLIA L.

Z. palustris L. ssp. *pedicillata* Wahlenb. et
Rosen.; FBI 6: 568; FUGP 3: 316.

In the south-east Rajasthan. Fls. &
frts. March-April. Jhalawar: Thanganbara
stream *Verma* 3379.

NAJADACEAE

NAJAS L.

1. Dioecious; leaf-sheath large, few,
back of the leaf and internodes with
similar teeth; anthers 4-locular ...
Monoecious; leaf-teeth numerous or
fewer, back of the leaf usually without
teeth ...

1. *N. marina*

2

2. Male and female flowers both without
spathes; anthers 4-locular ... 2. *N. graminea* 3
At least male flowers with spathe ...
3. Male and female flowers both in
spathes; leaf-teeth as long as the
breadth of the leaf; anther 4-locular ... 3. *N. indica*
Only male flower with spathe;
anther 1-locular; flowers solitary;
aericle on testa broader than long;
leaf-teeth minute, few upcurved ... 4. *N. minor*

1. **N. marina** L. *N. major* FBI 6: 569.

Kota-Cook et Gut. Jan. 1976.

2. **N. graminea** Del.; FBI 6: 569; FUGP
3: 317.

Widespread in Rajasthan. Kota: Shaha-
bad *Majumder* 13269.

3. **N. indica** (Willd.) Cham.; *N. minor* FBI
6: 569 pp.

Kota-Cook et Gut. Jan. 1976.

4. **N. minor** All.; FBI 6: 569.

Kota-Cook et Gut. Jan. 1976.

POTAMOGETONACEAE

POTAMOGETON L.

1. Floating leaves 7.5-10 cm long and
2.5-4 cm broad, elliptic or elliptic-
lanceolate, long petioled, petioles
2.5-12.5 cm long ... 1. *P. nodosus* 2
Leaves all submerged ...
2. Leaves ovate-cordate, amplexicaul,
2.5-3.8 cm long sessile ... 2. *P. perfoliatus*
Leaves filiform, opaque, 2.5-10 cm
long and 2-2.5 mm broad ... 3. *P. pectinatus*

P. nodosus Poir. *P. indicus* Roxb.; FBI 6:
565; FUGP 3: 314.

Widespread in Rajasthan. Fls. & frts.
March-July. Jhalawar: Chakli village tank
Verma 3314; Kota: Shahabad *Wadhwa*
9306.

P. perfoliatus L.; FBI 6: 566; FUGP 3:
314.

In the region east of the Aravalli. Fls.
& frts. Dec.-Jan. Kota: Bundi, Mangli river
Majumder 10422.

P. crispus L. is common in the adjoin-
ing areas. It is easily recognisable from
other species due to its crisped, sessile leaves.

P. pectinatus L.; FBI 6: 567; FUGP 3:
315.

Widespread in Rajasthan (*Dungerpur*
Verma 138; Jaipur *Wadhwa* 8392; Bans-

wara *Verma* 224). Fls. & frts. Feb.-April.
Jhalawar: Chappi river *Wadhwa* 9532.

ERIOCAULACEAE

ERIOCAULON L.

Anthers white; heads glabrous; bracts
glabrous, scarious, shorter than the
heads, floral similar to involucrel ...
Anthers black; heads more or less villous;
floral bracts ciliate at the apical part;
heads 3-4 mm across; leaves drying
green

1. *E. cinereum*

2. *E. sollyanum*

E. cinereum R. Br. *E. sieboldianum* Sieb.
et Zucc. ex Steud.; FBI 6: 577; FUGP
3: 318.

In the region east of the Aravalli. Fls.
& frts. Sept.-Jan. Kota: Shahabad *Majum-*
der 13137; 13214.

E. sollyanum Royle *E. trilobum* Buch.-
Ham. ex Koen.; FBI 6: 583; FUGP 3:
319.

In the south-east Rajasthan. Fls. & frts.
Oct.-Nov. Kota: Shahabad *Majumder*
13132; Kair-Kheri river *Majumder* 10456.
E. quinqueangulare L. is also reported
from Kota by Gupta. It closely resembles
E. sollyanum but foliage usually drying red;
floral bracts glabrous, long acuminate and
heads 5-6 mm across.